



**Electronic Benefit Transfer System Demonstrations
for the Food Stamp Program**

United States
Department of
Agriculture

Food and
Nutrition
Service

Office of
Analysis and
Evaluation

The Impacts of the State-Operated Electronic Benefit Transfer System in Reading, Pennsylvania

Electronic Benefit Transfer System Demonstrations for the Food Stamp Program

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EXECUTIVE SUMMARY

The Food Stamp Program provides benefits to needy households to help them purchase food. This process involves certifying households as eligible to participate, issuing them benefits, and redeeming benefits used to purchase groceries. The U.S. Department of Agriculture, Food and Nutrition Service (FNS) and State Food Stamp Agencies jointly administer the program. Currently, State Agencies issue benefits in the form of food stamp coupons.

For several years, FNS has sought alternatives to the current benefit issuance and redemption systems that are more efficient, less costly to administer, and less vulnerable to fraud and abuse. In 1983, FNS began funding a demonstration of one alternative issuance and redemption system in Reading, Pennsylvania: an Electronic Benefit Transfer (EBT) system using electronic-funds-transfer and point-of-sale technologies, which eliminated the use of coupons and paper issuance documents. The results of an evaluation of the demonstration are reported in William L. Hamilton *et al.*, The Impact of an Electronic Benefit Transfer System in the Food Stamp Program, Cambridge, Massachusetts: Abt Associates, Inc., May 1987.

The Reading EBT demonstration was extended beyond its original ending date of December 1985 by agreement between FNS and the Pennsylvania Department of Public Welfare (PDPW). PDPW assumed operational responsibility for the EBT system and, in March 1986, relocated the system's computers from Reading to the State's computer center in Harrisburg. In June 1987, PDPW implemented a redesigned EBT system capable of running on the State's computers. PDPW switched 700 additional households from the coupon system to the EBT system early in 1988, increasing the total demonstration caseload to over 4,200 households.

This report presents evaluation results for the extended portion of the Reading EBT demonstration. The evaluation compares the redesigned EBT system to the coupon system and to the original EBT system in terms of administrative costs; vulnerability to fraud and abuse; and system effects on grocers, food stamp recipients, and financial institutions.

DESCRIPTION OF THE ATP/COUPON SYSTEM

Throughout the United States, most food stamp coupons are issued when a recipient redeems an Authorization-to-Participate (ATP) card specifying the amount of coupons to which the recipient is entitled that month. The ATP may be mailed to the recipient or delivered directly to the coupon issuance agent (usually a local bank or post office). Other issuance systems include: (1) direct mail, in which the State Agency mails coupons directly to recipients; (2) on-line, in which recipients go to an issuance agent, and the agent verifies the issuance authorization through direct access to a computerized allotment file; and (3) the HIR system, a completely manual system in which recipients go to an issuance agent (usually the local welfare office) and sign a paper Household Issuance Record before receiving their coupons.

Recipients tender coupons as payment for food to grocers authorized by FNS. The grocers receive credit when they deposit the coupons at their local banks. Banks receive credit for the coupon deposits they accept when they send the coupons to a Federal Reserve Bank. Federal Reserve Banks destroy the coupons and debit a Food Stamp Program account at the U.S. Treasury.

DESCRIPTION OF THE REDESIGNED EBT SYSTEM

In both the original and redesigned EBT systems, each recipient household is issued a magnetically encoded plastic card for use in purchasing food. The recipient selects a personal identification number (PIN) to use in conjunction with the card and receives training in system procedures. The household's authorized benefit allotment is posted in an EBT system computer account, and the recipient is ready to purchase food with the benefits.

Each participating program-authorized retail store has a point-of-sale (POS) terminal at nearly all checkout counters. To process an EBT sale, the cashier passes the recipient's EBT card through the terminal's card reader, has the recipient enter his or her PIN, and enters the purchase amount on the terminal. After the terminal verifies that the correct PIN has been entered, it sends a purchase request message to the EBT system computer. The computer checks the recipient's account balance, debits the account for the purchase, and sends an authorizing message to the terminal. The system simultaneously credits the retailer's EBT account for the purchase amount.

The terminal then prints a paper receipt showing the purchase amount and the recipient's remaining account balance.

PDPW runs a program each day to total all retailer credits and produce a tape in the National Automated Clearing House Association format. The tape is sent by courier to the EBT system's clearinghouse bank, which electronically transmits the credits to the retailers' bank accounts via the Automated Clearing House (ACH) network. The clearinghouse bank receives an offsetting credit by wire transfer from a special FNS account.

These procedures are virtually unchanged from those followed by recipients, retailers, banks, and system operators in the original EBT system. The redesigned EBT system does use different processing hardware and software than those used in the original system, but the store terminals remain the same.

OVERVIEW OF THE EVALUATION

The evaluation of the extended EBT demonstration consists of five major areas of research, each of which has its own set of data sources.

- Administrative cost. Data were collected in interviews with program officials and time studies at the local welfare office and at the PDPW computer center. PDPW produced special cost reports for the demonstration.
- Benefit loss through error, fraud and abuse. Interviews on EBT system vulnerabilities with program officials and security experts were combined with loss reports for the ATP/coupon system and EBT system documentation.
- Impact on participating food retailers. Interviews with 114 participating retailers were conducted on the retailers' opinions and participation costs. Over 9,600 checkout transactions were observed.
- Impact on food stamp recipients. Five waves of surveys were conducted with a small sample of recipients using the EBT system, and two focus group sessions were held with recipients.
- Impact on financial institutions. Representatives of four local banks, the Federal Reserve, and the EBT system's clearinghouse bank were interviewed to collect information on participation costs and opinions.

The primary wave of data collection took place in mid-1988, once the redesigned EBT system's operations had stabilized. Administrative cost interviews and time studies also took place during the 1986-1987 period when PDPW was operating the original EBT system, as did the first two waves of recipient interviews. Additional data were obtained from EBT system reports and Food Stamp Program databases.

SUMMARY OF EVALUATION FINDINGS

The Pennsylvania Department of Public Welfare successfully implemented the redesigned EBT system and has operated the system without major technical problems since June 1987. Approximately 4,200 food stamp households and 150 retailers in the Reading area are served by the system. The evaluation's findings on the impacts of system operations are summarized in Exhibit 1 and discussed below.

EBT system administrative costs are substantially lower than during the original demonstration.

The administrative costs of benefit issuance and redemption for the redesigned EBT system are estimated at \$9.14 per case month, a reduction of two-thirds from the \$27.22 per case month operating cost estimated for the original EBT system. Labor costs for computer operations were reduced by integrating EBT system operations with the rest of PDPW's data processing, and by the increased level of automation in the redesigned system. FNS' purchase of the equipment leased for the original demonstration reduced non-labor costs.

During the period when PDPW operated the original EBT system, administrative costs were even lower, at \$7.55 per case month. The redesigned EBT system incurred increased costs for hardware and technical support, but it replaced a system that had reached its capacity and could not be expanded in a cost-effective manner.

The administrative costs of the redesigned EBT system exceed those of the ATP/coupon system.

The current estimate of ATP/coupon system administrative costs is \$2.74 per case month, substantially less than the EBT system cost and slightly

Exhibit 1

Summary of System Impacts

	ATP/Coupon System	Original EBT System	Redesigned EBT System
<u>Administrative Costs</u>			
Costs per case month	\$2.74	\$27.22	\$9.14
<u>Benefit Losses and Diversions</u>			
Total losses per case month	\$0.17	\$0.33	\$0.31
Total diversions per case month	\$3.96	\$1.04	\$1.09
Net losses per case month	\$0.09	\$0.17	\$0.16
Net diversions per case month	\$3.11	\$0.66	\$0.66
<u>Retailers' Costs of Participation</u>			
Costs per \$1,000 of benefits redeemed	\$23.88	\$13.22	\$17.28
<u>Recipients' Costs of Participation</u>			
Expenditures per case month	\$2.21	\$0.26	\$0.27
Time spent (in minutes) per case month	48	12	13
<u>Banks' Costs of Participation</u>			
Local banks' net costs per \$1,000 of benefits redeemed	\$7.78	\$0.40	\$0.67
Local banks' net costs per \$1,000 of benefits issued	-\$0.79	0	0
Clearinghouse bank's net costs per \$1,000 of benefits redeemed	0	-\$0.59	-\$0.56
Federal Reserve System's net costs per \$1,000 of benefits redeemed	0	0	0

Notes: ATP/coupon and redesigned EBT system impacts measured during the extended EBT demonstration. Original EBT system impacts measured during the original portion of the EBT demonstration.

EBT system impacts on Benefit Losses and Diversions reflect the expected impacts of systems of similar design in a non-demonstration environment.

less than the original demonstration period estimate of \$2.92 per case month. EBT costs are higher than coupon costs for several reasons. The EBT system uses a more expensive ID card than the ATP/coupon system and requires special recipient training. The terminals, telephone lines and computer time required to process EBT transactions cost more per case month than the coupon printing costs and issuance agent fees that are eliminated.

Some EBT costs stem from the fact that the system operates as a demonstration. For example, PDPW's operation of the EBT system requires a higher level of effort for technical support and project oversight than the more mature ATP/coupon system operations. Another factor is the size of the caseload served by each system. If the EBT system served more cases, some fixed costs would be spread over more households, thereby reducing per case month costs.

Total vulnerabilities to benefit loss and diversion are lower under the EBT system, but currently inadequate controls on system accessibility increase the potential for losses to the Food Stamp Program.

Based on the judgments of security experts, expected benefit losses and diversions in the redesigned EBT system total about \$1.40 per case month, compared with \$4.13 per case month for the ATP/coupon system. Expected losses to the Food Stamp Program in the redesigned EBT system are estimated to be \$0.31 per case month, given current controls on employee access to the system. This loss estimate reflects concerns over the potential for a "big hit" on the system through insider fraud. However, implementation of relatively simple control strategies would reduce the level of losses expected in the redesigned EBT system to an estimated \$0.07 per case month, less than half of the \$0.17 per case month level of losses in the ATP/coupon system.

The diversion of benefits from their intended use falls from \$3.96 per case month in the ATP/coupon system to \$1.09 per case month in the redesigned EBT system. Most of this reduction is due to the elimination of cash change (which may be spent on goods and services other than eligible foods) and a reduction in benefits lost by an stolen from recipients.

are estimated to be slightly lower in the redesigned EBT system than in the original EBT system because of a more secure operating environment and better control over the posting of issuance files. Benefit diversions are estimated to be slightly higher in the redesigned EBT system, because of less secure card encoding procedures.

Some of the estimated losses in both the ATP/coupon and EBT systems either are or could be recovered through billings to issuance agents and recoupment procedures. In addition, some diversions represent a portion of recipients' and retailers' costs to participate in the Food Stamp Program. When these costs and recoveries are excluded, net losses and diversions amount to \$3.20 in the ATP/coupon system, \$0.83 in the original EBT system, and \$0.82 in the redesigned EBT system.

Retailers' costs to participate in the Food Stamp Program are lower with the redesigned EBT system than with coupons.

Overall, average retailer food stamp participation costs under the redesigned EBT system are \$17.28 per \$1,000 of benefits redeemed, compared with \$23.88 per \$1,000 of coupon redemptions. Reduced handling and reconciliation activities are the main sources of the EBT system savings; small savings also are realized in float costs (the costs retailers' incur when funds from sales are not available immediately). EBT system participation costs slightly exceed coupon system costs in checkout costs, training costs, accounting errors, and unreimbursed telephone charges. Larger cost disadvantages for EBT are found in the areas of reshelving and space costs.

Estimates of retailers' participation costs in both the coupon and EBT systems rose between the original demonstration period and the implementation of the redesigned EBT system. Coupon system costs for retailers increased \$6.14 per \$1,000 of benefits redeemed, while EBT system costs rose only \$4.06 per \$1,000 of benefits. Increases in handling and reconciliation costs contributed most to the increase in both coupon and EBT costs.

A substantial majority of participating retailers support the redesigned EBT system.

Approximately 70 percent of retailers surveyed prefer the redesigned EBT system over the coupon and original EBT systems. Retailers do not perceive that the redesigned EBT system has caused significant impacts on store operating costs, total monthly sales, store profitability, or food stamp customer complaints. Some retailers perceived a downward effect on food stamp sales, a perception that was equally distributed across store types (i.e., supermarkets, grocery stores, convenience stores, and other stores). The perceived sales decline is not confirmed by monthly redemption data for coupon and EBT sales, which show that redemptions increased marginally during the extended demonstration.

Food stamp recipients in the extended demonstration continue to overwhelmingly prefer the EBT system over the ATP/coupon system.

In each of five surveys of food stamp recipients who used the EBT system, nearly three-quarters or more of the respondents preferred the EBT system to the ATP/coupon system. These recipients said that the EBT system was more convenient, more secure, and quicker or easier to use at the checkout counter. Only a small minority (one-fifth or less) preferred the ATP/coupon system, saying that it is easier to track benefits or quicker at the checkout counter with coupons. There was no systematic variation in system preference across subgroups of the respondents.

The nature and frequency of EBT system problems experienced by recipients changed little during the extended demonstration. Despite occasional problems with the redesigned system (including system slowness, equipment not working, and lost or damaged cards), the majority of respondents continued to find shopping with the EBT card easier than using food stamp coupons.

Recipients' costs of participation in the Food Stamp Program remain considerably lower in the EBT system than in the ATP/coupon system.

Recipients' out-of-pocket costs of participation in the redesigned EBT system are estimated to be about \$0.27 per case month, compared with \$2.21 for the ATP/coupon system. Recipients spend an estimated 48 minutes per case month obtaining benefits in the ATP/coupon system, but only 13 minutes per case month in the redesigned EBT system.

Recipients' costs of participation under the redesigned EBT system remain nearly unchanged from the levels estimated during the original demonstration. When averaged over all demonstration recipients, increases in trips to the welfare office by some recipients to obtain new or replacement EBT cards added about one cent per case month to recipients' direct costs of participation and about one minute per case month to recipients' time spent obtaining benefits.

Financial institutions have lower program participation costs under the EBT system and prefer it to the ATP/coupon system.

Local banks' costs of food stamp benefit redemption are \$0.67 per \$1,000 of benefits redeemed under the redesigned EBT system, compared with \$7.78 under the ATP/coupon system and \$0.40 under the original EBT system. Both EBT systems replace the banks' manual handling of food stamp coupons with the more automated process of accepting and posting electronic funds transfers.

In their role as coupon issuance agents, local banks receive compensation for issuing coupons that exceed their costs by \$0.79 per \$1,000 of coupons issued. These revenues, however, are not enough to offset the banks' coupon redemption costs.

Neither the EBT system's clearinghouse bank nor the Federal Reserve System experiences a net cost of participation in the EBT system. The clearinghouse bank's fees for initiating EBT deposits through the ACH exceed its costs by \$0.56 per \$1,000 of benefits. The Federal Reserve prices its services to cover costs.

All bank representatives interviewed for the evaluation expressed enthusiastic approval for the EBT system. Local banks strongly supported the elimination of their coupon issuance role, with its associated lobby traffic and paper processing. The EBT system allows all banks to integrate benefit deposit processing into their normal bank operations.

CONCLUSION

Although the Pennsylvania Department of Public Welfare had the unusual advantage of about 15 months of experience with the original EBT system, the extended EBT demonstration showed that a State Agency could take

over a vendor-developed EBT system, integrate operational procedures into its routine data processing functions, and run the system successfully. More importantly, the extended demonstration proved that a State Agency could design, develop, implement and operate a new EBT system without serious problems.

Pennsylvania's redesigned EBT system retained the high level of support expressed for the original EBT system among Food Stamp Program participant groups, all of whom have lower participation costs than under the ATP/coupon system. The vulnerability of the EBT system to benefit loss and diversion changed little and remained well below the level of the ATP/coupon system.

While administrative costs for the redesigned EBT system are substantially higher than for the ATP/coupon system, the small scale and demonstration setting make EBT costs unrepresentative of what would be expected under more realistic conditions. The future of the Reading EBT demonstration, and of other EBT demonstrations now underway, will show whether this one major drawback of an EBT system can be overcome.

TABLE OF CONTENTS

	<u>Page</u>
EXECUTIVE SUMMARY.....	i
Chapter One: INTRODUCTION.....	1
Chapter Two: DESCRIPTION OF THE ATP/COUPON AND EBT ISSUANCE SYSTEMS....	9
2.1 The ATP/Coupon System in Berks County.....	9
2.2 The Demonstration EBT System in Reading.....	15
Chapter Three: EFFECTS OF THE EBT SYSTEM ON THE COSTS OF ADMINISTERING THE FOOD STAMP PROGRAM.....	33
3.1 Administrative Costs of the EBT System and the ATP/Coupon System During Phase C.....	37
3.2 Comparison of Phase C EBT Operating Costs with Costs During Phase B and the Original Demonstration Period.....	80
3.3 Comparison of Phase C ATP/Coupon System Operating Costs with Costs During Phase B and the Original Demonstration Period.....	87
3.4 Design, Development and Implementation Costs of the Phase C EBT System.....	97
3.5 Generalizability of ATP/Coupon System and EBT System Administrative Cost Estimates.....	101
3.6 Conclusions.....	104
Chapter Four: SYSTEM VULNERABILITY TO BENEFIT LOSS AND DIVERSION.....	109
4.1 Excessive Authorizations.....	114
4.2 Excessive Redemption Credits.....	120
4.3 Benefits Lost During Production and Handling.....	126
4.4 Benefits Lost By or Stolen From Recipients.....	128
4.5 Recipients' Use of Benefits in an Unintended Manner.....	134
4.6 Lost Retailer Credits.....	138
4.7 Conclusions.....	141
Chapter Five: EFFECTS OF THE EBT SYSTEM ON PARTICIPATING FOOD RETAILERS.....	147
5.1 Retailer Opinions and Preferences.....	153
5.2 EBT System Effects on Checkout Costs.....	163
5.3 EBT Effects on Handling and Reconciliation Costs....	183
5.4 EBT Effects on Training Costs.....	191
5.5 EBT System Effects on Reshelving Costs.....	194

TABLE OF CONTENTS
(continued)

5.6	EBT System Effects on Funds Float.....	198
5.7	EBT System Telephone Costs.....	201
5.8	EBT System Impacts on Losses From Accounting Errors.....	202
5.9	EBT System Impacts on Space Costs.....	207
5.10	Conclusions.....	209
Chapter Six:	EFFECTS OF THE EBT SYSTEM ON FOOD STAMP RECIPIENTS.....	215
6.1	Recipients' Experiences Using the EBT System.....	220
6.2	Recipients' Opinions About the Issuance Systems.....	225
6.3	Recipients' Problems with the EBT System.....	232
6.4	Recipients' Participation Costs.....	240
6.5	Conclusions.....	250
Chapter Seven:	EFFECTS OF THE EBT SYSTEM ON FINANCIAL INSTITUTIONS.....	253
7.1	Local Banks' Role in Coupon Issuance.....	256
7.2	Local Banks' Role in Coupon Redemption.....	259
7.3	Banks' Role in EBT Redemption.....	263
7.4	Local Banks' Opinions and Preferences.....	268
7.5	Role of the Federal Reserve System.....	271
7.6	Opinions and Preferences of FRB Personnel.....	275
7.7	Conclusions.....	276
APPENDIX I:	A. GLOSSARY.....	I-1
APPENDIX I:	B. REPORTS FROM THE EVALUATION OF THE ORIGINAL EBT DEMONSTRATION.....	I-4
APPENDIX III:	A. DATA SOURCES AND METHODS FOR ADMINISTRATIVE COST ANALYSIS.....	III-1
	B. DETAILED ADMINISTRATIVE COST TABLES.....	III-18
APPENDIX V:	A. DATA SOURCES FOR ANALYSIS OF EBT EFFECTS ON RETAILERS.....	V-1
	B. ANALYSIS PROCEDURES.....	V-7
	C. SUPPLEMENTARY ANALYSES OF EBT SYSTEM EFFECTS ON RETAILERS.....	V-27

LIST OF EXHIBITS

		<u>Page</u>
Exhibit 1	Summary of System Impacts.....	v
Exhibit 2-1	Benefit Identification Card and Benefit Transaction Terminal and Printer.....	18
Exhibit 3-1	Phase C Administrative Costs to Authorize Access to Benefits: ATP System vs. EBT System.....	39
Exhibit 3-2	Phase C Cost to Deliver Benefits: ATP System vs. EBT System.....	48
Exhibit 3-3	Phase C Costs to Credit Retailers: ATP System vs. EBT System.....	55
Exhibit 3-4	Phase C Costs to Manage Retailer Participation: ATP System vs. EBT System.....	59
Exhibit 3-5	Phase C Costs to Reconcile and Monitor Issuance System: ATP System vs. EBT System.....	68
Exhibit 3-6	Summary of ATP and EBT System Administrative Costs in Phase C of the Extended Demonstration.....	76
Exhibit 3-7	Comparison of Detailed EBT System Operating Costs in the Original Demonstration, Phase B and Phase C Periods.....	81
Exhibit 3-8	ATP/Coupon System Operating Costs by Task: Comparison of Phase C with Original Demonstration and Phase B.....	88
Exhibit 3-9	ATP/Coupon System Costs to Authorize Access to Benefits: Comparison of Phase C with Original Demonstration and Phase B.....	91
Exhibit 3-10	ATP/Coupon System Cost to Deliver Benefits: Comparison of Phase C with Original Demonstration and Phase B.....	92
Exhibit 3-11	ATP/Coupon System Costs to Reconcile and Monitor Issuance System: Comparison of Phase C with Original Demonstration and Phase B.....	95
Exhibit 3-12	PDPW EBT System Development and Implementation Labor: Summary of Effort by Organization and Stage.....	99
Exhibit 3-13	Issuance Cost Data for ATP/Coupon System States (Ranked by Issuance Cost per Case Month).....	103
Exhibit 3-14	Summary of Administrative Costs: Original EBT Demonstration vs. Phase B and Phase C of Extended EBT Demonstration.....	105

LIST OF EXHIBITS
(continued)

Exhibit 4-1	Summary of Estimates of Gross Losses and Diversions.....	142
Exhibit 4-2	Summary of Estimates of Net Losses and Diversions.....	145
Exhibit 5-1	EBT System Problems Most Frequently Considered Serious....	154
Exhibit 5-2	Major System Problems During the Extended EBT Demonstration.....	156
Exhibit 5-3	Food Stamp System Preference.....	159
Exhibit 5-4	Retailer Perceived Impacts on Store Operations.....	161
Exhibit 5-5	Explanatory Variables in the Regression Analysis.....	167
Exhibit 5-6	Regression Model for Total Time (in Seconds) per Transaction: Each Store Type.....	169
Exhibit 5-7	Regression Model for Payment Time (in Seconds) per Transaction: Each Store Type.....	170
Exhibit 5-8	Time Increments of EBT Card and Coupon Transactions (Relative to Cash Transactions), Increments in Seconds per Transaction.....	172
Exhibit 5-9	Frequency and Estimated Delay for Problems Observed in EBT Transactions.....	175
Exhibit 5-10	Total Time (in Seconds) for Typical EBT Transactions When Treated as EBT, Coupon, or Cash Transactions.....	178
Exhibit 5-11	Retailer Checkout Costs: Full Cost per \$1,000 of Benefits Redeemed.....	181
Exhibit 5-12	Retailer Checkout Costs: Limited Opportunity Cost per \$1,000 of Benefits Redeemed.....	184
Exhibit 5-13	Handling and Reconciliation Costs of Coupon and EBT Systems.....	187
Exhibit 5-14	EBT and Coupon Handling and Reconciliation Costs for Original and Phase C Systems.....	189
Exhibit 5-15	EBT and Coupon Handling and Reconciliation Costs for Original and Phase C Systems, by Store Type	190
Exhibit 5-16	Training Costs for Coupon and EBT Systems.....	195
Exhibit 5-17	Reshelving Costs for Coupon and EBT Systems.....	197
Exhibit 5-18	Float Costs for Coupon and EBT Systems.....	200
Exhibit 5-19	Telephone Costs for the EBT System.....	203

APPENDIX EXHIBITS
(continued)

Exhibit VA-1	Store Distribution by FNS Code.....	V-2
Exhibit VA-2	Number of Observed Checkout Counter Transactions, by Store Type.....	V-5
Exhibit VB-1	Comparative System Cost Elements.....	V-8
Exhibit VB-2	Value of Food Stamp Benefits Redeemed.....	V-10
Exhibit VB-3	Explanatory Variables in the Regression Analysis.....	V-15
Exhibit VB-4	Profile of the Typical EBT Transaction, by Store Type....	V-18
Exhibit VB-5	Cost per Transaction by Store Type.....	V-21
Exhibit VB-6	Transactions per \$1,000 of EBT Benefits Spent.....	V-22
Exhibit VB-7	Retailer Checkout Costs: Full Cost per \$1,000 of Benefits Redeemed.....	V-23
Exhibit VB-8	Cost per Transaction Incorporating 20-Second Opportunity Cost Cutoff.....	V-25
Exhibit VB-9	Retailer Checkout Costs: Limited Opportunity Cost per \$1,000 of Benefits Redeemed.....	V-26
Exhibit VC-1	Periodic Retailer Interview Responses.....	V-28
Exhibit VC-2	Space Cost for EBT System.....	V-31

LIST OF EXHIBITS
(continued)

Exhibit 5-20	Accounting Error Losses for Coupon and EBT Systems.....	206
Exhibit 5-21	Space Cost for EBT System.....	210
Exhibit 5-22	Summary of Retailer Participation Costs per \$1,000 of Benefits Redeemed.....	212
Exhibit 5-23	Comparison of Phase C to Original Demonstration Retailer Participation Costs per \$1,000 of Benefits Redeemed: All Stores.....	213
Exhibit 6-1	Description of the Five Waves of Recipient Interviews.....	218
Exhibit 6-2	Mechanisms for Keeping Track of Account Balances on the EBT System.....	223
Exhibit 6-3	Recipients' Perception of Treatment When Using EBT Card Versus Coupons.....	226
Exhibit 6-4	Which System is Preferred by Recipients.....	227
Exhibit 6-5	Percentage of Respondents Citing Specific Reasons for System Preference.....	229
Exhibit 6-6	Ease of Food Shopping under EBT and Coupon Systems.....	231
Exhibit 6-7	System Preference and Ease of Shopping, by Primary Language and by Age Group.....	233
Exhibit 6-8	Frequency of Reported Problems.....	235
Exhibit 6-9	Percentage of Recipients Reporting Problems with the EBT System.....	238
Exhibit 6-10	Recipients' Assessment of Transaction Time.....	241
Exhibit 6-11	Summary of Monthly Costs of Participating in the Food Stamp Program: Demonstration vs. Comparison Groups.....	242
Exhibit 6-12	Factors Affecting Recipients' Participation Costs.....	244
Exhibit 7-1	Coupon Issuance and Redemption Costs and Compensation.....	264
Exhibit 7-2	EBT Operating Costs and Compensation for the Reading Banks and the System's Clearinghouse Bank.....	269
Exhibit 7-3	Comparison of Coupon Costs Versus EBT Costs.....	277

APPENDIX EXHIBITS

Exhibit IIIA-1	Caseload Data Used in Computing Costs per Case Month.....	III-5
Exhibit IIIA-2	BCAO Indirect Cost Factors for Phase B.....	III-9
Exhibit IIIA-3	BCAO Indirect Cost Factors for Phase C.....	III-10
Exhibit IIIA-4	Indirect Cost Factors for the PDPW Bureau of Information Systems for Phases B and C.....	III-12
Exhibit IIIA-5	Computation of State-Level Indirect Cost Rate for BCAO for Phases B and C.....	III-13
Exhibit IIIA-6	FNS Indirect Cost Factors for Phase B.....	III-15
Exhibit IIIA-7	FNS Indirect Cost Factors for Phase C.....	III-16
Exhibit IIIB-1	Phase C ATP System Costs to Authorize Access to Benefits.....	III-19
Exhibit IIIB-2	Phase C EBT System Costs to Authorize Access to Benefits.....	III-21
Exhibit IIIB-3	Phase C ATP System Costs to Deliver Benefits.....	III-23
Exhibit IIIB-4	Phase C EBT System Costs to Deliver Benefits.....	III-25
Exhibit IIIB-5	Phase C ATP System Costs to Credit Retailers.....	III-28
Exhibit IIIB-6	Phase C EBT System Costs to Credit Retailers.....	III-29
Exhibits IIIB-7	Phase C ATP System Costs to Manage Retailer Participation.....	III-31
Exhibit IIIB-8	Phase C EBT System Costs to Manage Retailer Participation.....	III-34
Exhibit IIIB-9	Phase C ATP System Costs to Reconcile and Monitor Issuance System.....	III-38
Exhibit IIIB-10	Phase C EBT System Costs to Reconcile and Monitor Issuance Systems.....	III-41

Chapter One

INTRODUCTION

The Food Stamp Program provides benefits to needy households to help them purchase food. This process involves three main administrative steps:

- 1) certifying households as eligible to participate in the Food Stamp Program,
- 2) issuing benefits to eligible households each month, and
- 3) redeeming benefits when they are used to purchase groceries.

State Food Stamp Agencies and their local offices certify households and calculate benefit amounts according to rules set forth by the U.S. Department of Agriculture's Food and Nutrition Service (FNS), the federal agency responsible for administering the Food Stamp Program. The State Food Stamp Agencies are responsible for benefit issuance, with oversight from FNS. Benefit redemption involves program participants, food merchants, financial institutions, the United States Treasury, and FNS.

Currently, State Agencies issue benefits in the form of food stamp coupons which are printed and shipped to the States by FNS. Each coupon has a face value of one, five or ten dollars and is bound in a book with one or more other coupons. State Agencies can use any of several different mechanisms for distributing coupons to program participants. The most common method involves issuing an Authorization-to-Participate (ATP) document to the recipient.¹ The recipient then takes the ATP, which specifies the benefit allotment, to a coupon issuance agent and redeems the ATP for coupons. Financial institutions and post offices often serve as issuance agents, under contract with the State Agency.

Other issuance methods include: (1) direct mail, in which the State Agency mails coupons directly to the recipients; (2) on-line, in which recipients go to an issuance agent, and the agent verifies the issuance authorization through direct access to a computerized allotment file; (3)

¹A glossary of terms and acronyms used in this report is included as Appendix IA.

direct delivery, in which ATPs are mailed to issuance agents rather than to recipients; and (4) the HIR system, a completely manual system in which recipients go to an issuance agent (usually the local welfare office) and sign a paper Household Issuance Record before receiving their coupons.

The redemption of food stamp benefits begins when recipients tender coupons as payment for food at grocery stores that are authorized by FNS to participate in the Food Stamp Program. Each grocer deposits the coupons at a local bank. The bank credits the store's account and submits the coupons to a Federal Reserve Bank, which credits the sending bank's reserve account and destroys the coupons. The U.S. Treasury credits the Federal Reserve for the amount of the coupons and debits a Food Stamp Program account maintained at the Treasury.

For several years, FNS has sought alternatives to the current benefit issuance and redemption systems which are more efficient, less costly to administer, and less vulnerable to fraud and abuse. In 1983, FNS began funding a demonstration of one alternative issuance and redemption system: an Electronic Benefit Transfer (EBT) system using electronic-funds-transfer and point-of-sale technologies to issue and redeem benefits. The site chosen for the demonstration was Reading, Pennsylvania.

The EBT demonstration system began operations in October 1984. Although EBT system operations were scheduled to end in December 1985, FNS and the Commonwealth of Pennsylvania agreed to extend the demonstration, which had received a positive response from program personnel, recipients, retailers, and financial institutions. Under the terms of the agreement extending the demonstration, the Pennsylvania Department of Public Welfare (PDPW) assumed operational responsibility for the EBT system and undertook to implement a redesigned EBT system.

FNS has funded evaluations of both the original and extended portions of the EBT demonstration. The evaluation results for the original EBT demonstration are presented in William L. Hamilton et al., The Impact of an Electronic Benefit Transfer System in the Food Stamp Program, Cambridge, Massachusetts: Abt Associates Inc., May 1987. The current report presents evaluation results for the extended demonstration. The evaluation compares the redesigned EBT system to the coupon system in terms of administrative costs, vulnerability to fraud and abuse, and effects on grocers, food stamp recipients, and financial institutions.

THE READING, PENNSYLVANIA EBT DEMONSTRATION

In July 1983, FNS chose Planning Research Corporation (PRC) to design, develop, implement and operate the first EBT system for the Food Stamp Program. The system proposed by PRC was an on-line, direct debit system, in which a recipient's food purchase involved an immediate or real-time communication with a central computer to debit the amount of the purchase from the recipient's food stamp account and to credit that amount to the retailer.

The PRC-designed system began operations in October 1984. Each month, about 3,400 food stamp recipients living in the four central ZIP code areas of Reading used the system, while approximately 1,900 recipients in the rest of Berks County continued to receive ATPs and food stamp coupons. About 170 FNS-authorized food retailers within a five-mile radius of downtown Reading were offered the opportunity to participate in the EBT system, and about 150 did so.

PRC operated the EBT system, under contract to FNS, through December 1985. Some technical problems leading to system slowdowns and downtime did occur during this period, but the system performed its basic functions -- issuing benefits, authorizing purchases, and crediting retailers -- throughout the 15-month period.

In the summer of 1985, PDPW responded to participants' favorable assessment of the system by requesting that the demonstration be extended. FNS agreed to extend the demonstration provided that a) PDPW assume operating responsibility for the system and lower its operating costs, and b) that PDPW improve the technical performance of the system.

The extended demonstration includes three phases, as defined below.

- 1) Phase A -- a three-month period (from January 1986 through March 1986) during which PDPW personnel learned to operate the PRC-designed EBT system. At the end of Phase A, the system's computers were moved from Reading to PDPW's data processing center at Harrisburg State Hospital (HSH).
- 2) Phase B -- a 15-month period (from April 1986 through June 21, 1987) during which PDPW operated the PRC-designed system. During this period, PDPW also designed and developed a new EBT system which would run on PDPW's existing computer configuration at HSH.

- 3) Phase C -- an open-ended period (beginning on June 22, 1987) during which PDPW is operating the redesigned EBT system. Continued operation of the redesigned system depends on annual renewal of the original FNS/PDPW agreement extending the EBT demonstration. The demonstration is currently authorized through June 30, 1990.

In January 1988, approximately seven months after PDPW implemented the redesigned EBT system, PDPW began expanding the caseload served by the EBT system. Although the area served by participating retailers stayed the same, approximately 700 recipients from areas adjacent to the original four ZIP codes were switched from coupon use to EBT system use. This expansion, completed in April 1988, brought the number of participating households to over 4,200. (The original caseload of 3,400 recipients had grown to over 3,500 through a natural increase in the size of the program caseload within the original demonstration boundaries.) About 150 retailers were participating in the demonstration at this time.

THE EVALUATION

The evaluation of the extended EBT demonstration is designed to answer questions in five major areas, summarized below:

- Administrative cost -- Are the costs to the government of operating the redesigned EBT system greater or less than those of the conventional ATP/coupon system? How do these costs compare with the costs of PRC's and PDPW's operation of the PRC-designed EBT system?
- Benefit loss through error, fraud and abuse -- Does the EBT approach to benefit issuance and redemption reduce the Food Stamp Program's vulnerability to loss or misuse of program benefits? What values of loss and misuse might be expected in the ATP/coupon and EBT systems?
- Impact on participating food retailers -- Compared with the ATP/coupon system, did the redesigned EBT system raise or reduce the costs retailers incur to participate in the Food Stamp Program? How does the EBT system affect checkout productivity, handling costs, and other cost elements? Which system do retailers prefer, and why?
- Impact on food stamp recipients -- Did the State's implementation of a redesigned EBT system affect the nature or frequency of problems recipients experience with the system? Were recipients' costs to participate

in the Food Stamp Program changed by implementation of the redesigned EBT system? Do recipients prefer the EBT or the ATP/coupon system, and why?

- Impact on financial institutions -- Compared with the ATP/coupon system, how does the redesigned EBT system affect financial institutions, especially in terms of the handling costs and funds float associated with food stamp redemptions? Which system do banks prefer, and

These major questions about the impacts of the redesigned EBT system are addressed in this report. The evaluation of the extended EBT demonstration has also produced several other reports dealing with issues of design, implementation, performance and security of the redesigned EBT system. Appendix IB identifies all the major evaluation reports pertaining to both the original and extended portions of the EBT demonstration.

Evaluation Design. For the purposes of this report, there are three separate time periods in the evolution of the Reading EBT demonstration for which data have been collected, analyzed and compared:

- 1) Original EBT Demonstration -- the period of PRC operation of the original EBT system (October 1984 through December 1985),
- 2) Phase B -- the period of PDPW operation of the PRC-designed EBT system (April 1986 through June 21, 1987), and
- 3) Phase C -- the period of PDPW operation of the redesigned EBT system (June 22, 1987 through August 1988).

The first period corresponds to the original demonstration period covered in the earlier evaluation. The latter two periods correspond to Phases B and C of the extended demonstration. The report contains no analysis of system operations during the three-month period of transition from PRC to PDPW operating responsibilities (Phase A).

Data collection efforts pertaining to the original demonstration period included multiple interviews with local, state and federal program

For the period of PDPW operation of the PRC-designed system (Phase B), the evaluation's data collection efforts focused on PDPW's costs of operating the system. These efforts included interviews with local, state and federal officials, as well as time studies at the Berks County Assistance Office (BCAO) and at PDPW's data processing center at HSH. In addition, the evaluation conducted a series of interviews with small groups of participating retailers and demonstration recipients. Examination of system and program reports and records rounded out the Phase B data collection process.

The evaluation included a more intensive data collection effort during Phase C of the extended demonstration, reflecting the evaluation's major focus on the effects of the redesigned EBT system on all system participants. A second wave of interviews with program officials and a second wave of time studies were conducted to ascertain the costs of operating both the redesigned EBT system and the ATP/coupon system. The series of interviews with small groups of recipients and retailers was continued, and two focus-group sessions with recipients were held. In addition, the evaluation conducted a major survey of all participating retailers to determine their full costs of participating in the program. Transactions at store checkout counters were observed as well. Representatives from financial institutions participating in the EBT system were interviewed. Finally, as during the Phase B period, system and program reports and records were analyzed to fill out the evaluation's data needs.

The evaluation results provided in this report, therefore, represent extensive analysis of the administrative costs of the Phase B and Phase C EBT systems, the administrative costs of the ATP/coupon system during Phase B and Phase C, and the effects on the EBT and ATP/coupon systems on retailers, and financial institutions during Phase C. Additionally, a more limited analysis of system effects on recipients during Phase B and Phase C is included. Throughout the report, the results are compared to previously reported results of the evaluation of the original demonstration period.

As with the evaluation of the original EBT system, the results from the extended EBT demonstration have some limitations. Most importantly, the extended demonstration represents the implementation of an EBT system in one location, and the two system versions operated during this period do not represent the full range of EBT system designs which are possible. Thus, as

with any demonstration effort, the results of the demonstration cannot reflect the full range of possible outcomes if other EBT systems were implemented in other locales. Further evidence on the feasibility and desirability of EBT systems will be provided by the four State-initiated EBT demonstrations funded by FNS in September 1988. (These demonstrations will be the subject of another FNS evaluation.) Nevertheless, this evaluation has gathered extensive, conclusive evidence about the costs and major impacts of the EBT system in Reading.

Chapter Two

DESCRIPTION OF THE ATP/COUPON AND EBT ISSUANCE SYSTEMS

This report discusses the operations and impacts of two different food stamp benefit issuance systems. The first is the conventional issuance system used in parts of Berks County throughout the original and extended portions of the Reading EBT demonstration. The conventional system uses Authorization-to-Participate (ATP) cards to authorize the issuance of food stamp coupons to food stamp recipients. The second system is the Electronic Benefit Transfer (EBT) system, which places program benefits in computerized accounts and allows recipients to buy groceries using a magnetically encoded EBT card.

This chapter describes the major operating features of the ATP/coupon and EBT issuance systems.¹ Although the descriptions focus on the two systems as they operated during Phase C of the extended demonstration, major differences between Phase C operations and earlier operations are noted.

2.1 THE ATP/COUPON SYSTEM IN BERKS COUNTY

The ATP/coupon system used in Berks County and throughout most of Pennsylvania is one of five different issuance systems that State Food Stamp Agencies use to distribute food stamp coupons.² The ATP/coupon system, however, represents the most common food stamp issuance system used in the United States. In Fiscal Year 1987, 33 states used the ATP/coupon system to issue some or all of their Food Stamp Program benefits. Of the \$10.5 billion in benefits issued nationwide that year, nearly half were issued through ATPs.

The major distinguishing characteristic of the ATP/coupon system is that ATPs are mailed to recipients each month, and recipients take their ATPs to issuance agents (often banks) to exchange them for coupons. Prior to the EBT demonstration, the ATP/coupon system was used throughout Berks County.

¹This description is based in part on the description of the two systems provided in William L. Hamilton *et al.*, *op. cit.*, pp. 7-23.

²As noted in Chapter 1, the other four systems are direct mail, on-line, direct delivery, and the Household Issuance Record (HIR) system.

During the demonstration, all recipients in Berks County who were not in the demonstration area continued to receive benefits through the ATP/coupon system. Over half of all food stamp households in Pennsylvania receive their benefits through the ATP/coupon system. Besides the EBT system, the direct delivery and on-line systems also are used.

AUTHORIZING RECIPIENTS TO GET BENEFITS

Under the ATP/coupon system, the Pennsylvania Department of Public Welfare (PDPW) authorizes a certain amount of benefits for each recipient each month. This involves three steps: placing current issuance authorization information on an Integrated Client Information File, printing ATP cards, and issuing the ATP cards. In addition, when recipients are first certified as eligible for the Food Stamp Program, the local welfare office issues identification cards to them.

Printing and Issuing ATPs. Currently, nearly all ATPs for non-demonstration Berks County recipients are laser-printed at PDPW's data processing center in Harrisburg and mailed to recipient households. The only exception is the first ATP issued to applicants qualifying for expedited service. In January 1987 (about two-thirds of the way through Phase B of the extended demonstration), the Berks County Assistance Office (BCAO) began issuing manually prepared ATPs to provide authorized benefits to expedited service recipients on a more timely basis. During the original demonstration period, all ATPs were printed in Harrisburg and mailed.

The use of laser-printed ATPs is another change from the ATP/coupon system in place during the original demonstration period. Prior to 1987, the State used computer-generated punch cards for ATPs. The State switched to laser-printed ATPs because the card stock is cheaper, easier to change, and capable of being read by optical character recognition (OCR) equipment. The ability to easily change the ATP card stock makes counterfeiting of ATPs harder, because a counterfeiter would never know when card stock was to be changed.

The ATP that the household receives each month contains the recipient's name, address, and case number, an ATP serial number, and an expiration date. It specifies the amount of food stamp benefits authorized for the month. Since July 1985, ATPs for regular monthly benefits have been issued on

two days.¹ In Berks County, ATPS are mailed so that half the recipient caseload receives its ATPs on the fourth workday of the month, and the other half on the ninth workday.

Another change in the issuance authorization process is the use of an integrated Client Information System, which contains information about all households participating in programs administered by the Pennsylvania Department of Public Welfare. Information on food stamp households was added to the system in February 1987. Prior to the change, the State placed issuance authorization information for food stamp recipients on a separate Food Stamp Master File. The switch to the integrated Client Information System was not part of the EBT demonstration. As a result of the switch, the generation of the file used to print ATPs became part of the same production process as the generation of files for printing AFDC checks and Medicaid cards.

Card Issuance. When a household is certified eligible to receive food stamp benefits, the local welfare office gives the head of household an identification card. This paper card, containing the recipient's name, case number, and signature, is valid through the period of certified eligibility.² The recipient presents the ID card when obtaining food stamp coupons, and retailers may request to see the card when the recipient uses coupons to buy groceries. If the recipient cannot go to the issuance office to obtain coupons or to the store to make food stamp purchases, the name of the recipient's authorized representative is printed on the card.

GETTING BENEFITS TO RECIPIENTS

To provide benefits to recipients under the ATP/coupon system, the Food and Nutrition Service (FNS) must print food stamp coupons and distribute them to issuance agents. Recipients receive their benefits when they exchange their ATPs for coupons.

¹Berks County went to a staggered issuance schedule in July 1985 to reduce peak loads on the EBT system. The staggered schedule is used for both demonstration and non-demonstration households.

²A statement on the back of the card reads, "This card must be returned when benefits are stopped." See Exhibit 2-1 on page 18.

FNS contracts with outside vendors to print and distribute food stamp coupons. Two companies have printing contracts with FNS. Coupons are printed in denominations of \$1, \$5, and \$10, and packaged in "books" with values of \$2, \$7, \$10, \$40, \$50, and \$65. The coupons have serial numbers, but carry no personal identification or expiration date. FNS' contractors ship coupons either to States' storage facilities (as in Pennsylvania) or directly to issuance points.

The Pennsylvania Department of Public Welfare contracts with a number of local banks in Berks County to serve as issuance agents. To exchange an ATP for books of food stamp coupons, a recipient must present his or her ID card and ATP to the bank teller and sign the ATP. (Alternatively, an authorized representative may present the signed ATP to the teller, in which case the authorized representative also signs the ATP.) The teller checks the signature against that on the ID card, and then records the name, case number, and amount and serial numbers of coupons issued. The teller keeps the ATP and gives the recipient the coupon books, which the recipient signs. At periodic intervals, the banks ship the redeemed ATPs back to PDPW for reconciliation purposes.

The banks generally maintain a two- to six-month inventory of coupons in secure storage with limited access. Banks report monthly on the value of coupons received, issued, and in inventory, and on the value of ATPs transacted.

ALLOWING RECIPIENTS TO BUY FOOD WITH BENEFITS

Recipients may use food stamp coupons at any food retail establishment authorized to participate in the Food Stamp Program,¹ including those participating in the EBT demonstration. They may use coupons only to purchase authorized items; this excludes all non-food products and any hot food items that grocery stores sell.

The cashier may (but is not required to) ask recipients to present their food stamp ID cards before accepting coupons in payment. When the

¹Current rules allow virtually any establishment to participate in the Food Stamp Program if staple food items make up over 50 percent of eligible food sales.

cashier announces the amount of the purchase, the recipient tears the appropriate amount of coupons out of the books or hands over entire books. Except for \$1 coupons, cashiers may not accept coupons previously torn out of the books, unless the recipient also presents the coupon book cover.

The cashier may give up to 99 cents change in cash. If more change is required, it must be given in \$1 coupons.

CREDITING RETAILERS FOR BENEFITS ACCEPTED

To redeem coupons, store personnel must first endorse them with a stamp identifying the store. They must then count the coupons and complete a Redemption Certificate. The grocer takes the coupons and the Redemption Certificate to the store's bank. The bank generally receives the coupon deposit as if it were cash, crediting the grocer's account immediately. First, however, the teller counts the coupons and writes in the verified amount and his or her initials on the Redemption Certificate.

CREDITING BANKS FOR BENEFITS ACCEPTED

Each bank cancels the coupons it receives and marks them with a bank name or number. It then bundles coupons from all of its grocer customers, fills out a Food Coupon Deposit Document, and ships the coupons, Redemption Certificates, and Deposit Documents to the Federal Reserve branch bank.

The Federal Reserve branch bank receives the coupons, verifies that the amount is consistent with the bank's Deposit Document, and checks for counterfeit coupons. The coupons are then destroyed, and the Deposit Documents and Redemption Certificates are sent to the Food Stamp Program's national data processing center in Minneapolis. The Federal Reserve Bank credits the sending bank's reserve account and submits a Debit Voucher against the Department of Agriculture's account at the U.S. Treasury.

RECONCILING THE FLOW OF FUNDS

Three main reporting systems exist to identify losses of food stamp benefits. First, issuance offices file coupon inventory reports that reconcile coupons received, coupons in inventory, and authorized and actual issuances. Second, PDPW matches the ATPs redeemed and returned by issuance

offices against its own records of ATPs issued. This identifies multiple ATPs transacted for the same authorization and invalid ATPs that were transacted. Third, the FNS data processing center in Minneapolis reconciles Redemption Certificates, Deposit Documents, and Debit Vouchers from the Treasury Department.

The introduction of laser-printed ATPs at the end of Phase B slightly changed the procedures for reconciling redeemed ATPs. With the punch-card ATPs, PDPW used punch-card readers to analyze the ATPs submitted by issuance agents. If the ATPs had been folded or otherwise damaged, however, data from the ATP had to be key-entered, introducing the possibility of entry errors. As previously mentioned, the laser-printed ATPs now used can be read by optical character recognition (OCR) equipment, which reduces the need for manual entry of data. Damaged or manually prepared ATPs still necessitate some key-entry of reconciliation data.

MANAGING RETAILER PARTICIPATION

In Berks County, retailers are authorized by the FNS Philadelphia Field Office (PFO). Interested establishments apply to this office for authorization. A PFO Field Representative provides initial instructions to retailers and usually visits them at least once to verify compliance with FNS regulations. The Field Representative will train store personnel in program procedures upon request.

The FNS Minneapolis Computer Support Center (MCSC) uses the data on stores' Redemption Certificates to produce reports on redemption activity. One purpose of this monitoring is to identify stores that redeem more coupons than would be expected for their size and location. Stores identified as "high redeemers" may be targeted for investigation by the area office of the FNS Compliance Branch. The MCSC also produces reports on inactivity by authorized retailers and unauthorized redemptions.

The FNS Compliance Branch conducts undercover investigations of stores suspected of selling unauthorized items or exchanging cash for coupons. (A PFO Field Representative also may visit a store if the PFO receives a complaint that a store is violating program regulations.) If a Berks County store is found to be in violation, the case is referred to the FNS Mid-Atlantic Regional Office (MARO) for sanctioning. Violations may be

punished by a disqualification from program participation or a fine. The grocer may appeal the sanction through the FNS Administrative Review Division and through the federal courts. The PFO carries out the sanction.

2.2 THE DEMONSTRATION EBT SYSTEM IN READING

The Reading EBT demonstration is testing one basic EBT system design -- an on-line, direct debit system using point-of-sale (POS) and electronic-funds-transfer (EFT) technologies. During the full course of the demonstration, however, three different versions of this basic design have been implemented. We refer to these three versions as:

- the original EBT system, the system designed and operated by Planning Research Corporation (PRC) during the original demonstration period;
- the relocated (or Phase B) EBT system, the PRC-designed system operated by PDPW during Phase B of the extended EBT demonstration; and
- the redesigned (or Phase C) EBT system, the system designed by PDPW and operated during Phase C of the extended demonstration.

From the perspectives of demonstration recipients, retailers, and banks, the three versions of the EBT system are quite similar. The procedures these groups follow for using each system have remained virtually unchanged over the course of the demonstration.

The State and local agencies' responsibilities for system operations, however, changed considerably with the implementation of the relocated and the redesigned systems. In addition, the actual processing of system functions changed at the beginning of Phase C with the introduction of new computers and system software. As presently configured, the EBT system uses the State's existing computer facilities for all system operations. Tandem TXP minicomputers are used for all on-line processing of EBT transactions. The system's data base of retailer and recipient accounts is also maintained on the Tandem. Unisys 1100 Series mainframe computers are used for all batch processing activities, which include creation of issuance files, retailer deposit files, and reconciliation reports. During the original and Phase B portions of the demonstration, all processing was done on a pair of IBM Series 1 computers.

The Phase C system's on-line processing software is based on commercial (off-the-shelf) POS software written by MTech and modified for the special needs of the Food Stamp Program. The system's batch processing software was developed by Unisys, with assistance from PDPW.

The sections below describe the operating features of the redesigned (or Phase C) EBT system. Major differences between the redesigned system and the original and relocated systems are noted.

AUTHORIZING CLIENTS TO GET BENEFITS

As with the ATP/coupon system, the state welfare department authorizes a certain amount of benefits for each demonstration household each month. The department currently places issuance authorization information on the integrated Client Information System. During the original EBT demonstration and part of Phase B of the extended demonstration, this information was placed in the Food Stamp Master File.

ATP cards are not used to authorize benefits in the EBT system. Instead, benefits are electronically posted to recipients' EBT accounts in the system's Client Authorization File (CAF), which includes information on recipients' remaining food stamp benefits. In addition, debit cards are issued to recipients.

Benefit Issuance. The computer file that PDPW normally uses to print ATPs contains an identifier in each household's record indicating whether or not the household is in the EBT demonstration. The records for demonstration households are extracted from the file before it is used to print ATPs. The extracted records (representing either regular or supplemental issuances) are transferred on tape from the Unisys mainframe to the EBT system's Tandem minicomputer. The file is used to post benefits to recipients' EBT accounts. The system automatically creates new account records when issuance information is received for new cases and credits the corresponding issuance amounts to the accounts. For ongoing cases, the issuance amounts are added to the recipients' existing balances.

During the original demonstration period, issuance files had to be transferred from Harrisburg to the EBT Center in Reading. Supplemental, pro-rated, and other non-recurring issuances were transmitted electronically over

a commercial telephone line. For the regular monthly issuances, which involved more records, a computer tape was physically delivered to the EBT Center.

Card Issuance. In the EBT system, the recipient's encoded Benefit Identification Card (BIC) and personal identification number (PIN) replace both the paper identification card and coupons used in the ATP/coupon system. The encoded cards have no expiration date. Thus, only one card is issued to each household, unless a lost, stolen, or damaged card needs to be replaced.

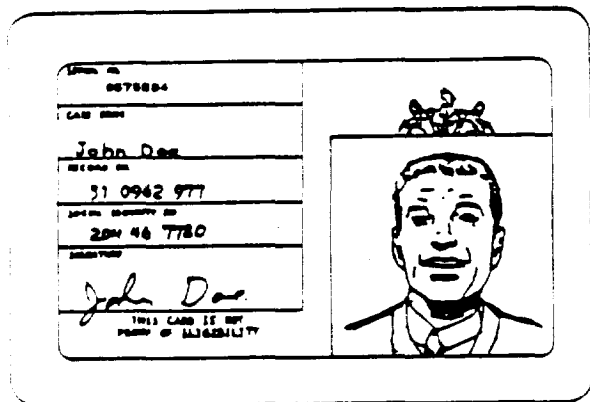
The head of household goes to the welfare office to obtain a BIC, although under certain circumstances an authorized representative may make the visit. A clerk takes the recipient's picture and produces a photo identification card. The recipient signs the card, which is then sealed in a plastic pouch in which a magnetic stripe is embedded. Another clerk encodes the card's magnetic stripe, completing the creation of the BIC. The front and back sides of the BIC are illustrated at the top of Exhibit 2-1. Except for the magnetic stripe at the back of the card, the BIC is identical to the identification cards used in the ATP/coupon system. The BIC used in the Reading EBT demonstration does not conform to industry standards for financial institution debit cards, largely because PDPW wanted the card to mirror the State's existing photo IDs.

Card Encoding. Card encoding procedures use a Tandem workstation, a Magtek card encoder, and a Benefit Transaction Terminal (BTT). The BTT, which is illustrated at the bottom of Exhibit 2-1, is the point-of-sale terminal used at store checkout counters throughout the demonstration area.

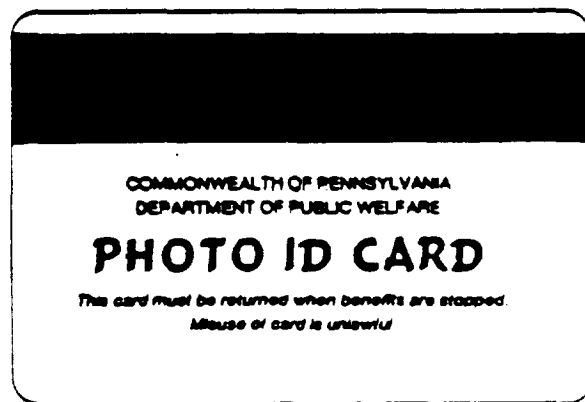
When preparing to encode a BIC, a clerk uses the Tandem workstation to query the EBT data base with the household's case number. The system responds with information about the recipient (name and address) and a system-generated BIC number. The clerk enters the recipient-selected PIN on the Tandem workstation, and the system computes a "PIN offset" (a special code based on the BIC number and PIN). The workstation displays the PIN offset, which is also recorded on the recipient's account in the Client Authorization File.

Exhibit 2-1

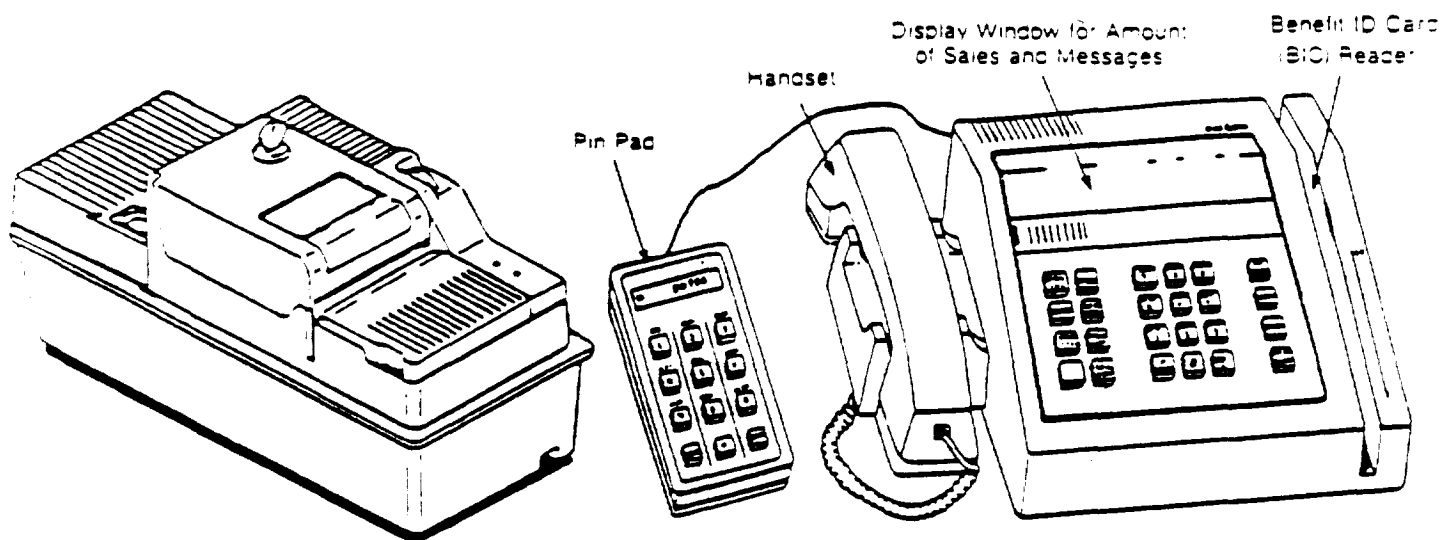
Benefit Identification Card and
Benefit Transaction Terminal and Printer



Benefit Identification Card
(front)



Benefit Identification Card
(back)



Benefit Transaction Terminal (BTT) Printer

Benefit Transaction Terminal (BTT)

The clerk then places the recipient's card in the card encoder and enters the BIC number and PIN offset on the encoder's keyboard. A check-sum digit (a code based on the BIC number and the computed PIN offset) is calculated by the encoder. These data are encoded on the card's magnetic stripe, and the encoder's display screen indicates the BIC number and PIN offset actually encoded on the card. The clerk then passes the encoded card through the BTT's card reader and enters the recipient's PIN on an attached PIN pad. The BTT verifies the entered PIN and displays a "select function" prompt. Once the prompt is received, the clerk knows that the card has been properly encoded.

The above card-encoding procedures are somewhat different than those used for the original and relocated EBT systems, which used an IBM micro-computer rather than a Tandem terminal as a workstation. After the clerk received the system-generated BIC number and entered the PIN on the IBM workstation's keyboard, the workstation computed the PIN offset and the check-sum digit. The card encoder connected directly to the workstation, eliminating the need for the clerk to keyenter either the BIC number or the PIN offset. When the Phase C system was being designed, PDPW discovered that the card encoder could not be attached directly to the Tandem workstation, thereby necessitating the change in encoding procedures. The security implications of the encoding clerk's access to the PIN and PIN-offset are discussed in Chapter 4.

After encoding the recipient's card and verifying the encoded information, welfare office staff train the recipient in how to use the BIC and PIN to purchase groceries, how to obtain information about his or her current account balance, and what to do and whom to call in the event of problems. If desired, the recipient can practice using the BIC by checking his or her account balance with a POS terminal like those located in the grocery stores.

To allow other members of the food stamp household or authorized representatives to purchase groceries, the recipient is given an Alternate Shopper Card. This paper card includes the recipient's name and case number, but it does not have a photo or a magnetic stripe. Using the Alternate Shopper Card together with the recipient's BIC and PIN, a person designated by the recipient may buy groceries with the recipient's food stamp benefits.

Converting EBT Benefits to Coupons. When recipients move out of the demonstration area, they can have their benefits removed from the EBT system and converted to food stamp coupons. Once a client's caseworker authorizes this conversion,¹ a clerk performs a special function on the EBT workstation to "zero out" the household's EBT account. The clerk then enters the amount of the household's remaining balance (rounded up to the next whole dollar, or to \$2 if the balance is less than \$2) onto the PDPW Client Information System as a request for a replacement ATP, which is printed that night at the HSH computer center and mailed to the client's address. The client can then exchange the ATP for coupons at any issuance agent in the state.

GETTING BENEFITS TO RECIPIENTS

Benefits are considered to be delivered when they are electronically recorded in recipients' EBT accounts. Thus, the EBT system eliminates the several steps associated with coupon issuance by combining them with benefit authorization.

Verifying the Recipient's Identity. Under the EBT system, store

someone other than the recipient uses the BIC to purchase groceries, that person is supposed to present the recipient's Alternate Shopper Card.

More importantly, however, the EBT system verifies the identity of the recipient through the four-digit PIN. The Benefit Transaction Terminal (BTT) located at the checkout counter performs the check. The cashier passes the recipient's BIC through the BTT's card reader and instructs the recipient

accept no further attempts to use the BIC until another recipient's BIC or a store card has been used at that BTT.¹ After the third incorrect entry, the BTT automatically transmits information about the unsuccessful PIN entry to the EBT system. Three such messages in a day cause the EBT system to "lock out" the BIC for the day.

Allowing three attempts to enter the correct PIN at the BTT represents a compromise between maintaining system security and recognizing that recipients might temporarily forget their PINs or mistakenly enter a wrong PIN. Multiple attempts to enter an incorrect PIN could represent an unauthorized person attempting to discover a recipient's PIN through trial and error. Recipients who cannot remember their PINs must return to the welfare office and have their BICs re-encoded with a new PIN offset.

ALLOWING RECIPIENTS TO BUY FOOD WITH BENEFITS

Two methods are available for buying food with EBT benefits. When the central computer system and the retailer's EBT equipment are working, payment for food is handled electronically. If either the system or the store equipment fails, manual backup procedures are used. Because terminals must be in place to electronically process EBT transactions, managing the terminal network is an added function in an EBT system.

Electronic Purchases. Nearly all checkout counters in participating stores are equipped with BTTs, PIN-pads, and printers. Recipients may make food stamp purchases at any counter that is so equipped. Each BTT has a card reader, and a handset which may be used to call system personnel for assistance.

Before any EBT transactions are processed, the BTT must be signed onto the system. Sign-on requires the use of a store BIC, a magnetically encoded card that contains information identifying the store, and a store PIN. Store managers receive two encoded cards when they begin participating in the demonstration.

¹The recipient, however, can go either to another BTT located in the same store or to another store to retry PIN entry.

After the cashier rings up the sale, the BTT verifies the recipient's identity as described above. The cashier then enters the total food stamp purchase amount on the BTT and presses a "Send" key. The BTT automatically dials the system computer and transmits information to identify the recipient and the store, the amount of the purchase, and an authentication code to make sure that information is transmitted correctly.¹

The system verifies that valid accounts exist for the recipient and the store. It then compares the recipient's account balance to the purchase total. If the balance is larger, the recipient's account is debited and the retailer's account is credited by the purchase amount. The system then sends to the BTT a message indicating that the transaction is complete. The BTT prints a two-part receipt stating the amount of purchase, the recipient's remaining account balance, the date and time, and information identifying the client and store. The cashier gives the recipient one copy of the receipt. The other copy is retained on a journal tape within the printer and serves as the retailer's record of the EBT transaction.

If the recipient's balance is less than the purchase total, the BTT displays the difference. The recipient may pay this amount in cash or remove some items from the purchase. In either case, the cashier initiates a new transaction with the new purchase total.

Credits can also be transmitted through the BTT. If a cashier accidentally overcharges a recipient or if a recipient returns items for a refund, the cashier carries out a procedure (using the recipient's card and PIN) very similar to that for a purchase. This results in a credit to the recipient's account and a debit to the store account. Such transactions require a "management override"; they can be processed only by individuals authorized by store management. As with BTT sign-on, the store's BIC and PIN must be used when processing a credit transaction.

¹The authentication code is derived from other information contained in the transaction message.

Manual Backup Purchase Procedures. If an electronic transaction cannot be processed, a recipient may still purchase up to \$35 worth of groceries each day. Such sales require verbal authorization from system personnel.

Three separate situations require use of manual backup procedures: (1) the system's computers are operating but a store's equipment is not, (2) the system is down but the store's equipment is working, and (3) a mobile vendor (who does not have immediate access to a BTT or a telephone) makes an EBT sale. The procedures followed in each situation are described below.

If the system is running but the store's EBT equipment is not working, no PIN check is performed. The cashier telephones an EBT "hotline" operator using the terminal's handset. During weekday hours, caseworker supervisors at the BCAO serve as hotline operators. When the local welfare office is not open, the call is answered by a data analyst at the Harrisburg State Hospital (HSH) data processing center.

The cashier tells the hotline operator the client's case number (printed on the BIC), the store's and cashier's identification numbers, and the amount of the purchase. The operator or analyst uses a Tandem workstation to check the recipient's current balance before granting authorization. System software automatically checks for earlier manual transactions that day to ensure that the recipient's \$35 daily limit is not exceeded. The operator also enters information about the sale on a special electronic log sheet (using a Unisys MAPPER terminal). The store cashier records the authorization code, the recipient's case number, the purchase amount, and the store's identification number on a three-part manual sales form. The recipient signs the form. The cashier retains one copy for the store, gives one copy to the recipient, and sends the third copy to the BCAO.

If the system is down but the store's EBT equipment is working, the BTT is used to verify the recipient's PIN. The cashier then calls the hotline. If the call is received at the BCAO, the operator calls the HSH hotline and asks the analyst there to check a computer listing of all recipients' remaining balances. (The listing is printed every night at midnight.) If the recipient's balance is sufficient, the BCAO operator gives the cashier an authorization code and enters information about the sale on the electronic log sheet. The store clerk then fills out the manual sales form, gets the recipient's signature, and distributes the copies of the form.

Mobile vendors, such as home delivery dairies, do not have access to BTTs. To process sales to food stamp customers, these vendors follow the same procedures that other retailers use when their EBT equipment is not working. The only difference is that the mobile vendors phone in transactions after they return to their offices.

Either immediately after authorization is granted or as soon as the system is once again operating, the hotline operator places a "temporary debit" against the recipient's EBT account, using a special workstation screen function. The debit is temporary only in the sense that it is not processed during daily system settlement until the BCAO receives the manual sales form from the store. The debit amount, however, is immediately subtracted from the recipient's remaining balance. When the store's form is received, it is reconciled against the debit information. Again using a workstation for data entry, the hotline operator removes the temporary status on the recipient's debit and the retailer's credit, and the system processes and settles the manual transaction just like a regular electronic transaction.

During the original portion of the EBT demonstration, all requests for manual authorizations were phoned into the EBT Center. System operators checked the recipient's current balance (if the system was running) or the computer listing of recipients' account balances, entered information about the sale onto a paper log, and used an IBM PC workstation to post the temporary debit. Stores sent one copy of the manual sales form to the EBT Center for reconciliation. During Phase B of the extended demonstration, manual sale authorization procedures were the same as those used in Phase C of the demonstration (except that hotline staff used the IBM PC workstations procured for the original demonstration).

Providing Balance Information. In the ATP/coupon system, recipients count their remaining coupons to determine their benefit "balances". Keeping track of the electronic balance in the EBT system is much different.

The system's Client Authorization File contains information on each recipient's current balance. The system credits or debits recipients' accounts for issuances, purchases, and refunds as they occur. If manual sales are authorized when the system is down, each sale is entered onto the system as soon as the system resumes operations.

Recipients may determine their current EBT balances by any of three methods. First, every time the recipient makes a purchase, the BTT receipt shows the remaining balance. Therefore, the most recent receipt usually shows the recipient's current balance. If the recipient's account has been credited with an issuance or debited with a manual sale since the last EBT transaction, however, the balance shown on the last receipt will be out of date.

Second, recipients may check their account balances by using BTTs. In addition to the regular terminals located at checkout counters, recipients may use balance-only BTTs located in the larger stores. To obtain a balance, the recipient or cashier passes the recipient's BIC through the card reader and the recipient enters his or her PIN. After PIN verification, the operator presses a "Balance" key on the BTT to send a balance request to the system. The system sends the recipient's current account balance back to the BTT, which displays it.

Third, recipients can learn their account balances by using a touch-tone telephone to dial a special toll-free EBT system number. This connects to the system's computer through a Unisys audio response unit. A synthesized voice answers, "Hello, please enter your case number." After the recipient enters the case number, the voice unit responds (in either English or Spanish, depending upon the recipient's preferred language), "Please enter your Personal Identification Number." The recipient enters the PIN, and the voice unit responds (again, in either English or Spanish), "Your current benefits are...."

Procedures for obtaining balance information changed only minimally between the original and extended portions of the EBT demonstration. At the beginning of Phase C, the State modified the original balance-only terminals to allow use of a separate PIN pad, but this affected operating procedures very little. In addition, the Unisys audio response unit in the Phase C EBT system is different from (and more reliable than) the unit used earlier. Finally, the initial prompt in the Phase C system's audio response unit is spoken only in English. In the original and Phase B portions of the demonstration, the initial prompt was given in both English and Spanish.

Managing the Terminal Network. When retailers' EBT equipment is not working or supplies like printer ribbons or printer paper are needed, retailers call the BCAO hotline for assistance. BCAO personnel deliver

supplies to retailers on an as-needed basis. If equipment problems cannot be resolved over the telephone, the hotline operator calls a service vendor with the service request. The service vendor replaces the malfunctioning unit and takes the unit back to the office for repairs. The hotline operator maintains a record of all calls for equipment servicing and the date and time of their resolution.

During the original EBT demonstration, PRC maintained a small staff of technicians for equipment servicing and distribution of supplies. All calls for assistance were handled at the EBT center by the system's operators, and then operators dispatched the technicians as calls were received.

CREDITING RETAILERS FOR BENEFITS RECEIVED

Although retailers' EBT accounts are credited as purchases are processed by the system, retailers cannot access the funds in these accounts. The EBT system credits retailers' bank accounts through an electronic transfer of funds, a process known as "settlement."

Settlement begins at the end of each processing day (which runs from 2 p.m. to 2 p.m.). A copy of the day's transaction log is passed from the Tandem to the Unisys computer. A batch program on the Unisys then sums each retailer's total credits and debits for the day. Each retailer's net credit and bank account number is then entered onto an Automated Clearing House (ACH) tape file, using a format designated by the National Automated Clearing House Association (NACHA). The ACH tape is sent by courier to Commonwealth National Bank (CNB) in Harrisburg, the system's clearinghouse bank. On days following weekends and bank holidays, multiple ACH tapes are sent to CNB.

After CNB receives the ACH tape (or tapes), it combines the EBT retailer records with non-EBT financial records from other bank customers requiring ACH processing. These records are submitted electronically to the Third District Federal Reserve Bank in Philadelphia. The Federal Reserve Bank debits CNB's reserve account by the total of all transactions (both EBT and non-EBT) and distributes credits to the bank accounts designated on the file. Thus, the system is designed to credit retailers' bank accounts within one banking day after an EBT transaction.

The above process describing settlement in the redesigned EBT system is nearly identical to the settlement procedures used by the original EBT system. The original system, however, used American Bank & Trust (AB&T) in Reading as the system's clearinghouse bank. Because some retailers used AB&T as their local bank, AB&T stripped these retailers' records from the ACH file before initiating the electronic funds transfer. AB&T credited these retailers' accounts directly. Because none of the retailers in Reading use CNB as their local bank, this latter step is not needed in the redesigned system.

CREDITING BANKS FOR BENEFITS ACCEPTED

Bank redemption of benefits in the ATP/coupon system involves each bank accepting coupons as deposits. In the EBT system, only the system's clearinghouse bank is involved in benefit redemption. Reimbursement of the clearinghouse bank's Federal Reserve account occurs when the bank initiates a wire funds request through the Treasury Financial Communications System network. This request, which goes to the Federal Reserve Bank in New York, is made the morning after the clearinghouse bank transmits the credits to the ACH. The New York bank draws down USDA's letter of credit with the U.S. Treasury, a special account established for the EBT demonstration. The bank simultaneously credits the clearinghouse bank's reserve account for the sum of the previous day's retailer credits.

The Treasury provides USDA with a daily report of the amount of the letter-of-credit drawdown. USDA is also able to check its account activity at any time with a computer terminal. In addition, PDPW records the daily credit total on a voice mail system accessible to FNS.

RECONCILING THE FLOW OF FUNDS

Account balances and benefit transfers are reconciled at numerous points in the EBT system. As described below, the major reconciliations occur when benefits are posted by PDPW, when accounts and daily EBT purchase transactions are balanced, and when retailer accounts are credited through the ACH funds transfer network. In addition, retailers may balance their sales receipts against deposits to their bank accounts, and retailer deposits are checked against drawdowns of USDA's letter of credit with the Treasury.

Reconciliation of Issuances. The State reconciles benefit issuances at two points -- when issuance amounts are posted to recipients' EBT accounts and when PDPW does its statewide reconciliation of all issuances.

Each day's issuance file contains a separate record for each household receiving an issuance. At the end of the file, a trailer record is appended which lists the total number of records on the file and the total value of all issuances. When the issuance file is used to update recipients' EBT accounts, the system counts the number of accounts updated and the total value of issuances posted to these accounts. The system then compares these two totals with the information on the issuance file's trailer record. The system report which is printed at the end of the update process includes a statement as to whether or not the update totals equal the totals on the trailer record. If not, system operators examine the issuance file and the update report to see where the error has occurred.

After each issuance file is posted to recipient accounts and reconciled, the Tandem computer produces a tape file with a record for each issuance amount. The tape file is read into a statewide issuance reconciliation file, which normally includes records of all ATPs redeemed by issuance agents. Thus, for statewide issuance reconciliation, PDPW treats issuances to EBT participants just like redeemed ATPs (although the EBT issuances can be separately identified, if desired). Each month, PDPW runs the statewide reconciliation program to match issued benefits against redeemed benefits.

Account and Transaction Reconciliation. Whenever the EBT system processes a transaction, a record of the transaction is written to a log file. This log file is used for retailer settlement (as described earlier) and for system reconciliation.

Every night at midnight, a series of batch programs on the Unisys computer analyze the previous day's log file and produce a series of reconciliation reports. Four major reports are created. The first two list the status of each retailer account and each recipient account. These reports indicate the amount of benefits in each account at the beginning of the day, the transaction activity processed against the account during the day, and the amount of benefits in each account at the end of the day (always using 2 p.m. as the end of the processing day). The reports note any accounts which do not balance at the end of the day, and this information is used for reconciliation investigations.

The third report summarizes total benefits entering the system (i.e., issuances) since system startup; total benefits leaving the system (in the form of retailer deposits or conversion of EBT benefits to ATPs); and total benefits remaining in recipients' accounts.

The fourth report is a summary of that day's activity for retailers and recipients. It serves as an electronic "general ledger" for the system, making sure that all flows of benefits for the day are in balance with each other and with benefits remaining in the system.

The above reconciliation system is quite similar to that used during the original and Phase B portions of the EBT demonstration. The major difference is the introduction of the fourth reconciliation report, which draws together and automates many data comparisons that previously were done manually by system personnel.

Deposit Reconciliation. Two steps are taken to make sure that the retailer deposit tape sent to Commonwealth National Bank each day contains the proper deposit information. The first step is performed by PDPW; the second step is performed by the bank.

As previously mentioned, the retailer deposit tape is created each day after 2 p.m. This ACH tape is produced by the Unisys computer, based on information contained in the Tandem's transaction log file. The Tandem produces a report listing each retailer's net deposit. This report is compared to a similar report produced by the Unisys computer to ensure that deposit information has been correctly transferred between the two computers.

The ACH tape sent to Commonwealth National Bank includes a trailer record summarizing information on the tape. When the bank processes the deposit tape, it checks its processing with the information on the trailer record. This confirms that the bank has correctly processed the system's ACH tape.

The retailer deposit tapes created for the original EBT system did not include trailer records. Instead, the clearinghouse bank processed the tape and created an acknowledgment tape which listed deposit information for each retailer. The acknowledgment tape was returned to the EBT Center, which checked the tape against its own records of information sent to the clearinghouse bank.

Retailer Reconciliation. As part of the balancing of their cash drawers, retailers need information on total EBT sales by shift or by day. They also need to reconcile their daily EBT sales with amounts subsequently credited to their bank account. To assist with this process, retailers can have the BTT print a net sales total at any time of the day (the total reflects all EBT sales and refunds since the last BTT sign-on). Retailers can compare this total to their bank statement at the end of the month. In addition, retailers can inspect journal tapes in the BTT to review each day's EBT sales.

Because the EBT system operates on a 2 p.m. to 2 p.m. processing day, reconciling daily sales to daily deposits is somewhat cumbersome. The retailer must check each BTT at 2 p.m. (a busy time of day) or manually total the information on the journal tape. In response to retailer concerns about reconciliation, PDPW added a new feature with the implementation of the redesigned system. Retailers can call a special audio response unit number to learn the amount of funds included in the previous day's ACH tape. The redesigned system also has the capability to let retailers choose a settlement cutoff time other than 2 p.m., a feature which would allow retailers to better integrate EBT reconciliation with their other cash drawer balancing procedures. However, this feature has not yet been implemented.

Other Reconciliation Activities. To verify the accuracy of the ACH funds transfer and the clearinghouse bank's wire funds request for account reimbursement, PDPW produces a weekly tape which summarizes total deposits to each retailer's account. The tape lists each retailer's total EBT sales by day and for the week, as well as a daily and weekly total for all retailers. The tapes are sent to the FNS Minneapolis Computer Support Center (MCSC). The MCSC reconciles total retailer deposits against information on drawdowns to the demonstration's letter-of-credit account, provided by the U.S. Treasury.

Management Reports. In addition to reconciliation reports, the EBT system produces a number of management reports. These reports include statistical summaries of monthly activity patterns, logs of problems reported by retailers and recipients, and summaries of system performance levels.

MANAGING RETAILER PARTICIPATION

With the exception of PDPW's maintenance of the terminal network, management of retailer participation under the EBT system is similar to this function under the ATP/coupon system. The FNS Field Office in Philadelphia authorizes new retailers, processes complaints, and administers sanctions against the retailers. Upon authorizing a new retailer wishing to participate in the EBT demonstration, however, the Field Office notifies PDPW so that EBT equipment can be installed. Similarly, the Field Office notifies PDPW when a participating store has closed or been disqualified, so that EBT equipment can be removed. (In a few cases, PDPW has removed equipment from stores which processed no EBT transactions for several months.)

The EBT system also has the ability to immediately "lock out" a retailer's EBT account, preventing further transaction processing for that retailer. Thus, once the Field Office notifies PDPW that a store has closed or been disqualified, the system can ensure that no further EBT sales from that store are authorized.

Retailer compliance monitoring and enforcement procedures in the EBT system differ in some ways from those in the ATP/coupon system. The FNS Minneapolis Computer Support Center uses PDPW's weekly retailer summary tapes in place of Redemption Certificates as the input source for the redemption monitoring system. In addition, Compliance Branch investigators must have a BIC and a funded EBT account to carry out their undercover investigations. While the redesigned system is capable of maintaining investigatory accounts, however, PDPW has received no requests from FNS to establish such accounts or to issue access cards to Compliance Branch investigators.

IMPACTS OF THE EBT AND ATP/COUPON SYSTEMS

The remaining chapters of this report focus on the impacts of the EBT and ATP/coupon systems on Food Stamp Program participants. While the current chapter has presented a general outline of how the two systems work and how they differ, more detailed information is sometimes needed to understand differences in system impacts. Where required, the remaining chapters provide this detailed information.

Chapter Three

EFFECTS OF THE EBT SYSTEM ON THE COSTS OF ADMINISTERING THE FOOD STAMP PROGRAM

The desire to reduce administrative costs was one of the factors that originally prompted FNS to explore the EBT system as an alternative to the existing coupon-based issuance systems. The ATP/coupon system and other FSP issuance systems require the production, distribution and control of large quantities of paper documents -- including over 2 billion food stamp coupons each year. FNS saw the EBT system as a way to streamline benefit issuance and redemption, freeing up FNS and State resources for more productive uses.

The \$27 per case month cost of operating the Reading EBT system during the original demonstration period (compared with under \$3 per case month for the ATP/coupon system)¹ made administrative costs a central issue for future EBT demonstrations. Administrative costs for the original EBT system were high because of a combination of circumstances: the small scale of the demonstration; the need for 24-hour staffing; the use of short-term equipment leases; and the need for extensive technical support by the system's builder, PRC. These circumstances were virtually inevitable, given the stand-alone configuration of the system, the limited period of operation planned for the demonstration, and the novelty of applying EFT and POS technology to benefit issuance. Nonetheless, the size of the cost difference between the EBT and ATP/coupon systems focused attention on how EBT system operating costs could be reduced.

In agreeing to extend the EBT demonstration, FNS sought to determine how the changes to be made by PDPW would affect the cost difference between the EBT and ATP/coupon systems. As noted in Chapter 1, the Pennsylvania Department of Public Welfare (PDPW) relocated the original EBT system's computers to Harrisburg and operated that system during Phase B of the extended demonstration. The State implemented and operated a redesigned EBT system during Phase C.

¹William L. Hamilton et al., op. cit., p. 27.

This chapter presents the evaluation's findings on the Reading EBT system's effects on administrative costs during the extended demonstration period. The primary question addressed is how the operating costs of the redesigned EBT system compare with the current operating cost of the ATP/

KEY HYPOTHESES

The relocation and redesign of the EBT system were expected to reduce operating costs in several ways. The relocation would enable BDEW to

management of retailer participation, funding and monitoring the letter of credit, and overseeing system operations.

RESEARCH STRATEGY

The collection and analysis of administrative cost data were designed to determine the issuance cost per case month for the EBT system and the ATP/coupon system in Phases B and C of the extended demonstration. "Issuance" is defined for this evaluation as the set of operational activities that provide allotments of food stamp benefits to recipients, enable them to exchange those benefits for food, and ensure the integrity of the process. The evaluation does not examine the effects of the EBT system on other FSP administrative costs, such as eligibility determination, computation of benefits, or sanctioning recipients. The effects of the EBT system on FSP benefit losses are examined separately in Chapter 4.

The data sources used for measuring issuance costs were:

1. cost reports and other extant data, including special monthly EBT project cost reports produced by PDPW throughout the demonstration;
2. interviews with key officials at BCAO, PDPW, and FNS; and
3. time studies at BCAO and PDPW's Harrisburg State Hospital (HSH) computer center.

The interviews were conducted in two waves: in the summer of 1987 for Phase B data, and in the summer of 1988 for Phase C data. The time studies were conducted in December 1986 and May 1988. The BCAO time studies covered ATP/coupon system and EBT system tasks performed by caseworkers and clerks, plus EBT hotline and retailer training staff. The HSH time studies covered EBT system tasks performed in the areas of computer operations, production control, the tape library and (only in Phase C) telecommunications operations. Labor costs for managers, technical support personnel, and other staff not covered by the time studies were obtained from the interviews, cost reports, and other extant data, as were the non-labor costs.

The Phase C costs were measured after the completion of the EBT caseload expansion in April 1988. Thus, these measures reflect the per case month savings on fixed costs of EBT system operations (such as management) realized by the expansion, as well as the effects of the system redesign.

The evaluation also documented the cost of designing, developing and implementing the Phase C EBT system. The interviews conducted in the summer of 1987 and PDPW's cost reports during Phase B provided the data for this analysis.

HIGHLIGHTS

Operating costs for the redesigned EBT system are estimated at \$9.14 per case month, significantly less than the \$27.22 per case month cost of the original EBT system but still higher than the estimated \$2.74 per case month administrative cost for the ATP/coupon system during Phase C. In the EBT system, the largest costs are those of maintaining the network of point-of-sale (POS) terminals, issuing benefit cards, and overseeing operations. The major components of ATP/coupon system costs are issuance agent fees, ATP printing and postage, and coupon printing and distribution.

EBT system operating costs during Phase B of the extended demonstration are estimated at \$7.55 per case month. Phase B EBT system operating costs are lower than those for Phase C in three major areas: computer processing, technical support, and telecommunications. Computer costs were artificially low in Phase B, however, because the equipment was largely paid for before FNS bought it from the leaseholders. Technical support costs rose in Phase C because a relatively mature system was replaced by a new system that required close monitoring, even after a year of operations. Telecommunications costs increased from Phase B to Phase C because of an exogenous change in PDPW's long distance rates.

EBT system operating costs during both Phase B and Phase C would be higher if the POS terminals had not been mostly paid for by the leases during the original demonstration period.

ORGANIZATION OF THE CHAPTER

Section 3.1 compares the operating procedures and costs of the EBT system during Phase C with those of the ATP/coupon system on a function-by-function basis. In Section 3.2, the EBT system's operating costs during Phase C are compared with system operating costs during Phase B and the original demonstration periods. Section 3.3 presents a similar discussion of trends in Berks County ATP/coupon system operating costs from the original demonstration

period to Phase C. Section 3.4 summarizes the costs of designing, developing and implementing the Phase C EBT system. In Section 3.5, the generalizability of the Phase C results is assessed through comparisons to ATP/coupon system costs in other States and a discussion of the next wave of EBT systems. The chapter concludes in Section 3.6 with a summary and discussion of the major findings.

Appendix IIIA presents supplementary material on the administrative cost analysis. This appendix discusses the data collection and analysis methods, including the indirect cost factors used. Additional details of the cost data in the text are presented in Appendix IIIB, Exhibits IIIB-1 through IIIB-10.

3.1 ADMINISTRATIVE COSTS OF THE EBT SYSTEM AND THE ATP/COUPON SYSTEM DURING PHASE C

The people who operate the EBT and ATP/coupon systems perform five major administrative functions. They:

- authorize recipients' access to the benefits to which they are entitled;
- deliver benefits to recipients so they can purchase food;
- credit retailers for the benefits they accept;
- manage retailer participation in the FSP; and
- reconcile the flow of benefits and monitor issuance system performance.

This section presents estimates of the costs of performing these functions in the EBT and ATP/coupon systems during Phase C of the extended demonstration. The ATP/coupon system estimates are for the non-demonstration portion of Berks County, but much of the data applies to the entire State of Pennsylvania or to the nation. The discussion focuses on the operational features that contribute significantly to issuance costs.

COSTS TO AUTHORIZE ACCESS TO BENEFITS

Once the local food stamp agency has certified that a household is eligible for benefits, the agency must perform two major tasks to ensure that the household will obtain its authorized allotment. First, the head of household needs an identification card (ID) as proof of program eligibility in order to use benefits and, in the ATP/coupon system, to obtain coupons at the issuance agent. Second, the agency must transmit a record of the household's monthly allotment to the household or to the point of benefit delivery, such as an issuance agent or a coupon mailing site.

The estimated costs during Phase C to authorize access to benefits in the two issuance systems are summarized in Exhibit 3-1.¹

The cost of this function in the ATP/coupon system is estimated at \$0.80 per case month, while the EBT system cost is \$1.74 per case month. Issuing and replacing ID cards (and the associated task of training recipients in how to use the system) is much more expensive in the EBT system, at \$1.18 per case month compared with \$0.10 per case month for the ATP/coupon system. A major reason for this difference is that the EBT system uses a magnetically encoded photo ID card, while the ATP/coupon system uses a much simpler paper ID. On the other hand, transmitting the allotment record and related tasks cost \$0.70 per case month in the ATP/coupon system and only \$0.56 per case month in the EBT system.

The administrative process and the major cost components of the authorization function are described below, first for the ATP/coupon system and then for the EBT system.

¹Exhibits 3-1 through 3-5 present the EBT and ATP/coupon system costs for each major function. Each of these exhibits shows (on a task-by-task basis) the labor costs by agency and other costs for all agencies, by line item. Supplementary cost tables are presented in Appendix IIIB. The tables in this appendix break down all costs by task and agency, and show the indirect costs attributable to each direct cost. The tables showing detailed costs for authorizing access to benefits are Appendix Exhibits IIIB-1 and IIIB-2.

Exhibit 3-1

Phase C Costs to Authorize Access to Benefits:
ATP System vs. EBT System

Task/Item	ATP System Cost per Case Month	EBT System Cost per Case Month
1. Issue, Update and Replace ID Cards		
BCAO labor	\$0.077	\$0.55
BIS labor	--	<0.01
DMCS labor	<0.01	<0.01
Cards and other supplies	<0.01	0.07
Data processing	--	<0.01
Equipment	--	0.09
Telecommunications	--	0.23
Shipping of cards and other supplies	<0.01	<0.01
Indirect costs ¹	<u>0.03</u>	<u>0.22</u>
Task Total²	\$0.10	\$1.18
2. Transmit Allotment/Other Benefit Authorization		
BCAO labor	\$0.29	\$0.09
BIS labor	0.01	0.07
DMCS labor	<0.01	--
Mailroom labor	<0.01	--
Blank ATPs and envelopes	0.02	--
Data processing	0.06	0.07
Equipment	<0.01	0.16
Postage and presorting	0.24	--
Telecommunications	--	0.08
Space (for blank ATPs)	<0.01	--
Indirect costs ¹	<u>0.08</u>	<u>0.08</u>
Task Total²	\$0.70	\$0.56
Total Cost to Authorize Access to Benefits	\$0.80	\$1.74

Notes: ¹See Appendix IIIA for explanation of indirect cost factors.
²Items may not sum to totals due to rounding.

Sources: BCAO time studies, HSH time studies, PDPW and FNS interviews, and PDPW cost reports.

ATP/Coupon System

Issuing, Updating and Replacing ID Cards. The Berks County Assistance Office issues a paper ID card to each newly certified ATP/coupon system case. A clerk types case information on the card, mails it to the recipient along with the notification of certification, and files a duplicate in the case record. If the ID is lost, stolen or damaged, the recipient must obtain authorization from a caseworker before a replacement can be issued. Blank ID cards are serialized and secured to prevent theft or unauthorized use, and clerks log all ID production and destruction activity. The PDPW Division of Management Consulting Services (DMCS) procures the blank IDs and ships them to the local welfare offices. BCAO issues paper IDs to approximately 8 percent of the ATP system caseload each month, including new and replacement IDs.¹

Transmitting Allotment Amounts. In the ATP/coupon system, the process of transmitting records of authorized allotment amounts to recipients includes the following activities:

- printing and mailing ATP cards;
- issuing non-routine ATPs; and
- replacing lost and stolen ATPs.

Each of these activities is described below.

Printing and Mailing ATP Cards. Each month, PDPW prints and mails over 200,000 ATP cards to eligible households. (The remaining non-EBT cases receive their benefits through an on-line coupon issuance system or through direct delivery of their ATPs to issuance agents.) The ATP specifies the amount of the household's benefits, the primary recipient's name and address, the case number, and the expiration date (normally the end of the calendar month). Recipients use their ATPs and food stamp IDs to obtain their coupon allotments.

PDPW's Bureau of Information Systems (BIS) prints the ATPs at its Harrisburg State Hospital (HSH) computer center. FSP benefit authorization data reside in PDPW's integrated Client Information System, along with similar

¹Based on data for May 1988.

data for cash and medical assistance programs. BIS computer operators run a single stream of programs on PDPW's Unisys mainframe computers to extract data for printing ATPs, cash assistance checks, and medical assistance cards. The operators transfer the file of ATP data to a Xerox 9700 laser printer, which prints three ATPs on each page of stock. BIS production control staff cut the ATPs apart, bundle them for transfer to the PDPW mailroom, and check that the actual production matches the input file. The paper stock for the ATPs is stored securely in the PDPW warehouse and requires special handling procedures by BIS staff.

ATPs are printed and mailed on a schedule that ensures their arrival between the first and tenth working days of the month, depending on location. Berks County recipients get their ATPs on the fourth and ninth working days. In the PDPW mailroom, clerks stuff ATPs (and sometimes informational inserts) into envelopes, using machines that can handle 4,500 pieces per hour. A contractor sorts the ATPs by nine-digit ZIP code, allowing PDPW to pay the reduced postage rate for presorted mail.

Issuing Non-Routine ATPs. At BCAA, recipients who qualify for expedited benefits receive manually issued ATPs. Once a caseworker authorizes an expedited ATP, a clerk types up the ATP and enters the issuance data on the PDPW Client Information System (CIS). Related clerical tasks include tracking expedited cases to make sure issuance deadlines are met and controlling the supply of blank ATPs. In May 1988, BCAA issued 33 manual ATPs, 3 percent of the total ATP issuance for the county.

BIS prints all other non-routine ATPs, such as non-expedited issuances for newly certified cases and supplemental issuances. At BCAA, caseworkers authorize non-routine issuances, and clerks enter the necessary data on the CIS. Each weekday evening, BIS operators run a program to accumulate the day's non-routine authorizations, which are printed and mailed by the same process as recurring ATPs.

Replacing Lost and Stolen ATPs. To obtain a replacement for a lost or stolen ATP, a recipient must submit an affidavit to his or her caseworker. Before the worker authorizes a replacement, a clerk queries the CIS to verify that the ATP was issued and that it has not been transacted. To issue a replacement ATP, a clerk completes the appropriate screen on the CIS, which generates a record for the day's non-routine ATP production. Under special

circumstances, a replacement ATP may be issued manually. In Phase C, replacements represented about 0.1 percent of all ATPs transacted by Pennsylvania households (excluding Philadelphia and Allegheny Counties, which do not use the regular ATP system).

Estimated Costs of Authorizing Access to Benefits. The ATP/coupon system cost to authorize access to benefits is estimated at \$0.80 per case month, as shown in Exhibit 3-1. (Detailed costs by agency and type for each task are shown in Appendix IIIB, Exhibit IIIB-1.) The largest part of the \$0.70 per case month cost of transmitting allotments (i.e., issuing and replacing ATPs) is BCAO labor. Postage and presorting, BIS data processing, and supplies are the other important costs. The \$0.10 per case month cost of issuing, updating and replacing IDs is nearly all labor, including ID production by clerks, caseworker time dealing with ID problems, and State-level effort to procure and distribute blank IDs. No special equipment is required, and blank cards cost less than \$0.01 per case month.

EBT System

Issuing, Updating and Replacing ID Cards. In the EBT system, this task includes the following activities:

- issuing benefit cards;
- training recipients to use the EBT system; and
- replacing lost, stolen and damaged benefit cards.

These activities are described below. Issuing and replacing benefit cards is analogous to the food stamp ID tasks in the ATP/coupon system, but the ATP/coupon system does not involve training of recipients, aside from a brief explanation during certification and, occasionally, subsequent questions addressed to caseworkers.

Issuing Benefit Cards. Recipients in the EBT system obtain access to their benefits through a Benefit Identification Card (BIC), which is a photographic ID card with an embedded magnetic stripe. Once a caseworker has certified a household, a clerk schedules the head of household to come into the BCAO to receive a BIC and select a personal identification number (PIN). BCAO issues cards to new recipients daily at specified times.

To produce a BIC, a clerk first types the recipient's name and case number on a blank form, which the recipient signs. Another clerk takes a photograph of the recipient with a special camera that superimposes the photograph on a copy of the signed form. The clerk then laminates the photographic ID card in a plastic pouch containing the magnetic stripe. The original signed form is placed in a central file, where it can be retrieved for use in replacing the BIC.

Once the recipient has selected a PIN, a clerk enters the case number and the PIN onto a Tandem terminal that is on-line to the EBT system. (The household must already have an EBT system account before a card can be issued.) The system responds with a card number and PIN offset, which the clerk encodes on the card via a keyboard-operated Magtek encoder. The clerk then checks proper encoding of the BIC by passing the card through the card reader of a Benefit Transaction Terminal (BTT). Finally, because the encoding equipment is located on a different floor from the training area, an additional clerk is needed as a courier.

Training Recipients to Use the EBT System. Recipients select their PINs and learn to use their BICs in training sessions led by a BCAO Human Services Aide, assisted by at least one clerk at the encoder. Training sessions are held daily to accommodate expedited cases, but non-expedited cases are generally scheduled to be trained on the three days a week when an extra clerk is available to accommodate large groups. Before the Phase C caseload expansion, an average of 125 households received training each month. The average session involves 8.5 participants and lasts about 71 minutes (including preparation time for the trainer).¹

Each session begins with a videotaped overview of the EBT system, followed by an explanation of the purpose of the PIN. The recipients then select their PINs, and the courier takes the PINs and the cards to the encoder.

While the cards are being encoded, the Human Services Aide shows the rest of the video and demonstrates the use of the BIC. The training also

¹The average number of cases per session and the average session length are drawn from Phase C time study data for May 1988.

covers balance inquiries and care of the BIC. The session concludes with recipients practicing using their newly encoded cards to do balance inquiries on BTTs, with assistance from the Human Service Aide and one or more clerks.

Replacing Lost, Stolen and Damaged Benefit Cards. A recipient who has lost a BIC or had it stolen calls his or her caseworker or a special toll-free "hotline" number to report the loss. During weekdays, an Income Maintenance Supervisor assigned to the demonstration generally answers this number at BCAO; if he or she is unavailable, several other Income Maintenance Supervisors are trained to serve as back-ups. During evenings and weekends, a Data Analyst at the HSH computer center takes hotline calls. The hotline operator places a hold on the card via a Tandem terminal function, preventing further use of the card.

At specified times each workday, recipients can obtain replacements for lost, stolen or damaged cards at BCAO. The production process for replacements is the same as for the initial card, except that the recipient is not required to repeat the training and the original form is re-used. If a recipient has forgotten his or her PIN, a clerk can enter a new PIN on the EBT system and re-encode the card. Before the expansion (which introduced many new cards into the EBT system), the Phase C average replacement rate was 131 cards per month (or .037 per case month). Lost cards accounted for 55 percent of BIC replacements, while 11 percent were replaced because of theft and 34 percent because of damage.

Transmitting Allotment Amounts. In the EBT system, this task includes the following activities:

- posting benefits to EBT accounts;
- non-routine EBT issuances;
- responding to issuance problems;
- providing issuance information; and
- other benefit authorization activity.

FNS policy considers a household to have participated in the FSP once benefits have been posted in its EBT account. Once posted, the benefits are considered equivalent to coupons issued and belong to the recipient. Details of these activities are presented below.

Posting Benefits to EBT Accounts. When the PDPW computer creates the recurring issuance records for Berks County, the software separates out the allotments for EBT recipients before generating the final file of ATPs to be printed. The EBT allotment file is stored on tape until the night before the recipients are scheduled to receive the allotments, when a member of the BIS scheduling unit retrieves it. A BIS operator loads the EBT file onto the Tandem TXP, together with the day's non-routine issuances, and runs the software to update the recipient balances. This program creates accounts for households receiving their first issuances (before posting the initial issuances) and generates an acknowledgment tape for PDPW's reconciliation process.

Non-Routine EBT Issuances. At BCAA, the process of initiating one-time or supplemental EBT issuances is the same as for ATP/coupon cases: a caseworker authorizes the issuance, and a clerk performs the necessary function on the CIS. When the PDPW computer processes the day's authorizations, it generates a separate file of EBT issuances, which the operator immediately posts on the EBT system. This procedure is also used for expedited EBT issuances, since the EBT system makes benefits available to permit training on the next day after BCAA enters the data. Clerks still track EBT cases qualifying for expedited benefits, just as in the ATP/coupon system.

Responding to Issuance Problems. While the EBT system eliminates the need to replace lost or stolen ATPs, it does not completely eliminate issuance-related problems. Caseworkers and hotline staff must occasionally respond to recipient complaints about delayed or incorrect issuances. When a recipient is leaving the demonstration area for a sufficient period, the caseworker may have to arrange for a clerk to perform the "buy-ATP" function, removing the remaining benefits from the EBT system and issuing a replacement ATP in the amount of the balance.

Providing Issuance Information. Although recipients are notified of their benefit allotments and issuance dates when they are certified, they do not receive monthly notices in the EBT system analogous to ATPs. The system's audio response unit (a Voice Information Processing System supplied by Unisys), however, makes it possible for recipients to check their balances by

telephone. Recipients can also perform balance inquiries at regular BTTs or balance-only terminals.¹

Other Benefit Authorization Activity. BCAO clerks carry out a variety of other minor benefit authorization tasks under the EBT system. One such task is "zeroing out" accounts that are never activated because the client failed to appear for training, a procedure established during the original demonstration period. This operation is recorded on the EBT system as a "buy-ATP," but the clerk simply places a screen printout in the case file instead of issuing a replacement ATP. BCAO staff "zero out" about 10 cases per month and complete a report with the date, case number, amount and reason to permit reconciliation between PDPW's issuance history and the EBT system. Clerks also perform data inquiries on the EBT workstation.

Estimated Costs of Authorizing Access to Benefits. The cost to authorize access to benefits in the EBT system is \$1.74 per case month, as shown in Exhibit 3-1. The largest component of this cost is BCAO labor for card issuance and training, at \$0.55 per case month. (Appendix IIIB, Exhibit IIIB-2 shows the Phase C EBT costs by agency and type for this function.)

The cost of issuing, updating and replacing IDs is substantially higher than in the ATP/coupon system (\$1.18 versus \$0.10 per case month). The more elaborate ID used in the EBT system imposes greater requirements for labor, equipment, telecommunications, and supplies, as shown in Exhibit 3-1. About half of the BCAO labor cost of this task (\$0.27 per case month) is devoted to setting up appointments, training, and other activities that serve only new EBT households; another \$0.25 per case month involves taking photos, encoding cards, and other activities for new and replacement cards; and only \$0.03 per case month is for caseworker and hotline effort related exclusively to replacements. In the ATP system, by comparison, BCAO labor costs are \$0.05 per case month for new paper IDs and \$0.02 per case month for paper ID

¹Recipient balance inquiries can be a check on benefits used (a benefit delivery task) as well as a check on benefits issued. The Voice Information Processing System (VIPS) also provides deposit information to retailers. Therefore, the costs of the VIPS are divided among three functions: authorizing access to benefits, delivering benefits, and crediting retailers. All costs for POS devices are counted under the benefit delivery function, because their primary use is for purchase transactions.

replacements. Problems with ID cards are more frequent in the EBT system and require more effort: BCAO caseworkers spend almost six times as much time per case month on EBT card problems as on paper ID card problems.

The cost of posting benefits and related EBT benefit authorization activity is only \$0.56 per case month, which is less than the \$0.70 per case month cost of the analogous activities in the ATP/coupon system. The difference arises from the added effort in the ATP/coupon system to issue manual and replacement ATPs.¹

DELIVERING BENEFITS TO RECIPIENTS

The ATP/coupon and EBT systems differ most strikingly in the way they deliver benefits to recipients. In the ATP/coupon system, recipients exchange their ATP cards for food stamp coupons, which they can use at any authorized grocery store. The EBT system stores the recipients' benefits electronically until the recipient uses them via a Benefit Identification Card (BIC) and a Benefit Transaction Terminal (BTT) in a participating grocery store.

As Exhibit 3-2 shows, the Phase C ATP/coupon system cost to deliver benefits is estimated at \$1.42 per case month, compared with \$3.83 per case month for the Phase C EBT system. Most of the ATP/coupon system cost comes from the \$1.14 per case month of transacting ATPs and related activities. The largest components of EBT system benefit delivery costs are maintaining the terminal network (\$2.87 per case month) and resolving transaction problems (\$0.53 per case month). (In Appendix IIIB, Exhibits IIIB-3 and IIIB-4 break down benefit delivery costs by agency and cost type for the two systems.)

¹Evidence from the original demonstration period suggests that ATP replacement costs would be higher for the caseload in the demonstration area than observed for the Phase C ATP system caseload. During the period before EBT system implementation, the cost of ATP-related caseworker time for cases in the demonstration area was \$0.08 per case month, compared with \$0.03 per case month for the rest of the county. See William L. Hamilton *et al.*, *op. cit.*, Appendix III, p. III-6 for further information.

Exhibit 3-2

**Phase C Costs to Deliver Benefits:
ATP System vs. EBT System**

ATP SYSTEM COSTS			
Task/Item	Cost per Case Month	Task/Item	Cost per Case Month
1. Manage Coupon Supply		2. Transact ATPs	
CPSU/MARO labor	\$<0.01	PDPW labor	\$<0.01
FSS/DSA labor	0.02	Bank fees	1.13
Coupon printing	0.17	Postage and supplies	<0.01
FNS coupon storage, distribution and shipping	0.02	Indirect costs ¹	--
PDPW armored carrier	0.07	Task Total ²	\$1.14
Other PDPW direct costs	<0.01	Total Cost to Deliver Benefits	\$1.42
Indirect costs ¹	<0.01		
Task Total ²	\$0.29		
EBT SYSTEM COSTS			
Task/Item	Cost per Case Month	Task/Item	Cost per Case Month
1. Process Transactions		3. Maintain Terminal Network	

ATP/Coupon System

Supplying Coupons. FNS supplies food stamp coupons to State Agencies and their issuance agents. Under contract to FNS, vendors print, store and distribute over 2 billion coupons each year. Armored cars and registered mail are used to ship coupons, either to State storage sites or directly to issuance points. The FNS Coupon Production and Supply Unit (CPSU) coordinates coupon orders at the national level and oversees the activities of the production and distribution contractors. The FNS Mid-Atlantic Regional Office (MARO) processes coupon orders from Pennsylvania and the other states in the region, forwarding the orders to the CPSU and tracking shipments to the States for reconciliation purposes.

In Pennsylvania, an armored carrier under contract to PDPW receives the coupon shipments from FNS and stores them in a secure facility. The contractor makes a delivery to each issuance agent every four months or when the site has less than a two-month supply. The PDPW Food Stamp Section (FSS) oversees the coupon delivery contractor, monitors inventories, and submits orders to FNS. The PDPW Division of Special Audits (DSA) annually checks each issuance agent's coupon inventory against its monthly inventory reports.

Coupon Supply Costs. The cost of supplying coupons is \$0.29 per case month in Pennsylvania, as shown in Exhibit 3-2. Coupon printing costs account for \$0.17 per case month. Other FNS coupon supply costs include storage, distribution, shipping, and staff time to oversee the coupon supply. PDPW coupon supply costs include \$0.07 per case month for the armored carrier contract, plus labor, other direct costs, and indirect costs.

Transacting ATP Cards. To obtain food stamp coupons in Berks County, a recipient presents his or her ATP card and food stamp ID card at one of the banks that serve as issuance agents. The teller watches the recipient sign the ATP, verifies the validity of the signature and the ATP, counts the recipient's coupon allotment indicated on the ATP, and records the transaction in a paper log. Bank staff perform monthly coupon inventories and ship their inventory reports and canceled ATPs to the PDPW computer center at HSH.

The PDPW Food Stamp Section (FSS) manages and reimburses the issuance agents. The FSS processes additions, changes and deletions to the roster of issuance agents contracting with the State. FSS staff review the

computer-generated invoices for issuance agent reimbursement, forward them to the office of the PDPW Comptroller for approval, and mail the reimbursement checks and invoices to the banks. In the Comptroller's office, staff approve the invoices for payment, send them to the State Treasury to have the checks issued, and enter payment data on the PDPW accounting system.

ATP Transaction Costs. As Exhibit 3-2 shows, the cost of transacting ATPs and related tasks is \$1.14 per case month. Issuance agents receive \$1.10 per ATP for transacting regular ATPs. The Phase C cost of \$1.13 per case month for issuance fees reflects an estimated 1.03 ATPs transacted per case month by regular ATP households in Pennsylvania.¹ (A household may transact more than one ATP per month if it receives a supplemental issuance.) PDPW labor costs for issuance agent management and reimbursement by FSS and Comptroller staff amount to less than \$0.01 per case month.

EBT System

Processing Transactions. In the EBT system, recipients normally use their benefits in electronic transactions between terminals in participating stores and the system's Tandem TXP computer. (An alternate purchase procedure is used when the store's equipment or the Tandem computer is not functioning, as described under "Resolving Transaction Problems.") The BTT reads data from the recipient's BIC, checks the PIN entered by the recipient against the PIN offset on the card, and transmits the purchase request to the computer. The computer checks the retailer ID, the terminal ID, and the client card number against its files, determines if the client's balance is sufficient, sends a message to the BTT authorizing or rejecting the transaction, and logs the result. If the computer authorizes the transaction, it debits the recipient's account and credits the retailer's account on its files. The BTT displays the computer's response and, if the transaction is authorized, prints receipts for the recipient and the retailer.

The BIS Technical Services Division (TSD) maintains the Tandem TXP computer and associated hardware as part of its responsibility for PDPW's

¹See notes to Appendix IIIB, Exhibit IIIB-3, for explanation of the Phase C ratio of ATPs per case.

telecommunications network. TSD staff monitor the operation of the TXP, run utility programs, and respond to system problems.

Transaction Processing Costs. The cost of processing routine EBT purchases is \$0.24 per case month, out of the total cost of \$3.83 per case month for benefit delivery, as indicated in Exhibit 3-2. With an average of 7.8 purchases per case month, it costs about 3.1 cents to process an EBT purchase.¹ Nearly all of this cost (\$0.22 per case month) represents the share of TXP operating costs attributable to EBT purchases.² The remainder of the transaction processing cost is TSD labor and indirect costs.

Resolving Transaction Problems. When a problem arises in attempting to make a transaction, the store clerk can use the BTT handset to call the 24-hour EBT hotline. The BCAO or BIS operator (depending on the time of the call) determines the nature of the problem and follows standard procedures to resolve it.

If the store has no functioning BTTs, the operator can authorize a "manual sale," using a workscreen on a Tandem terminal that causes a debit against the recipient's account. The hotline also authorizes manual sales for route vendors. If the EBT system is down, the hotline uses the most recent report of recipient balances and records the sale on paper. (Sales authorized when the EBT system is down are entered as soon as the system is restored.) The retailer completes a sales slip, which the recipient signs, and sends the slip to BCAO. The primary BCAO hotline worker reconciles the slip against the posted sale, using another Tandem workscreen that credits the retailer's account.

¹Based on EBT system reports for July 1987-September 1988.

²During the 1987-88 State Fiscal Year, the total operating cost of the TXP (including amortization and maintenance) was \$46,418 per month. PDPW allocated \$1,160 per month (or \$0.28 per case month) to the EBT demonstration, based on the 2.5 percent of the TXP capacity used by the EBT system. This EBT cost for TXP use has been divided among the tasks that use the TXP in proportion to the number of transactions, based on counts of issuances, purchases, cards encoded, and other transactions processed by the TXP. Purchases and related transactions (refunds, non-approved purchase requests, etc.) make up 81 percent of all recorded transactions in the Phase C data.

At times, the hotline responds to transaction problems simply by providing information. A retailer can request the hotline to call up his transaction history for the day to verify that a particular transaction has been completed. Clients also call about various problems with transactions.

The most frequent type of transaction problem is a manual sale, accounting for 83 percent of the labor cost of this task. The next most frequent type of transaction problem is a request for a purchase verification or other retailer history inquiry. Retailer problems other than manual sales account for 10 percent of the labor cost of resolving transaction problems, with the rest of this cost arising from client problems with accounts or purchases. "Resolving transaction problems" does not include responding to problems with retailers' EBT equipment or telephone lines; these types of problems are considered part of "maintaining the terminal network," as described later in this section.

Costs of Resolving Transaction Problems. As Exhibit 3-2 shows, the cost of resolving EBT transaction problems is \$0.53 per case month, more than twice the cost of routine transaction processing. The largest component of this cost is the \$0.26 per case month for telecommunications, which represents the applicable share of the telephone line that provides dial-up access for the BCAO Tandem terminal and forwards calls to the HSH branch of the hotline. The other major direct costs are \$0.14 per case month for the use of the Tandem terminals for this task, \$0.07 for BCAO labor, and \$0.03 for BIS hotline labor.

Maintaining the Terminal Network. To be able to process transactions, the EBT system requires a terminal network, including BTTs, printers, and telephone lines. At the end of the original demonstration period, FNS purchased the 398 Omron CAT-100 terminals and 355 NCR miniprinters (including installed units and spares) that had been leased by the original demonstration contractor (PRC). This equipment is loaned to PDPW for the duration of the extended demonstration. PDPW pays for approximately 100 Centrex lines installed in participating stores and six off-premise extensions carrying transaction data between the Reading telephone exchange and the Tandem computer in Harrisburg.

A PDPW contractor services the terminals and printers when they malfunction. The retailer calls the hotline to request service, and the

hotline calls the contractor's dispatcher if the problem cannot be resolved over the telephone. Hotline operators log all trouble calls and their results on PDPW's Unisys MAPPER system. The primary BCAO hotline worker also coordinates installation of terminals and printers in newly FNS-authorized stores. The BIS Technical Services Division arranges the installation of telephone lines in newly authorized stores by Bell of Pennsylvania. BCAO maintains supplies of printer paper, ribbons and manual sale slips, which the retailers usually pick up at the BCAO.

Costs of Maintaining the Terminal Network. At \$2.87 per case month, maintaining the terminal network is the most costly task in the EBT system. The largest cost component shown in Exhibit 3-2 is the contract for terminal installation and service, at \$1.53 per case month. The retailer telephone service cost (including the Centrex lines and off-premise extensions) is \$0.64 per case month, while the amortized cost of the equipment is \$0.57 per case month.¹ Other costs of maintaining the terminal network include BCAO and BIS labor, telecommunications for the hotline, and supplies (printer paper and ribbons, etc.).

Providing Balance Information to Recipients. The EBT system provides balance information to recipients in several ways. In addition to having the balance printed on the transaction receipt, recipients can check their remaining benefits at a regular BTT or a balance-only terminal (installed in high-volume locations away from the checkout lanes), or by calling the Voice Information Processing System (VIPS) attached to the Tandem computer.

Balance Information Costs. The cost of providing automated balance information is \$0.19 per case month. The share of the VIPS lease and maintenance applicable to this task is \$0.15. The remaining direct cost is the share of charges for the WATS line that provides toll-free access to the VIPS. (The costs of other balance inquiry modes are included in the cost of maintaining the terminal network.)

¹The cost of the store terminals and printers is based on the monthly payment to amortize the \$98,404 spent by FNS to buy out the leases on this equipment over a 45-month period, assuming a 5 percent opportunity cost of funds. The life for this equipment is based on an expected five-year life at the time of installation. See Appendix IIIA for further details.

In interpreting the equipment costs for a given function in the EBT system, it is important to recognize that eliminating one use of a piece of equipment will not necessarily reduce overall issuance costs. For example, the VIPS, which is used exclusively by the EBT system, has a fixed monthly cost of \$2,592, or \$0.61 per case month (including applicable indirect costs). As noted earlier, the analysis divides this cost among the functions of authorizing access to benefits, delivering benefits, and crediting retailers. Thus, if the VIPS were not used for one function, the portion of the VIPS' fixed monthly cost assigned to that function would be assigned to the other two functions, increasing their cost and leaving the total EBT system cost unchanged. The Tandem terminals used by B CAO and BIS staff also impose fixed costs that are allocated for analytic purposes among multiple tasks. Computer usage charges, on the other hand, represent an allocation between the EBT system and other uses, so these charges are variable and, in theory, could be reduced by eliminating a task performed by the computers, such as the weekly retailer data tape for FNS.¹

CREDITING RETAILERS FOR BENEFITS ACCEPTED

The FSP must provide a mechanism to credit retailers in cash for the benefits they accept. Both the ATP/coupon system and the EBT system use the retailers' banks and the Federal Reserve system to accomplish this function, but the former involves the physical handling of coupons while the latter uses electronic funds transfer technology.

Exhibit 3-3 shows that EBT system costs to credit retailers are \$1.13 per case month, while ATP/coupon system costs are only \$0.16 per case month. (Detailed system costs for this function are shown by agency and type in Appendix IIIB, Exhibits IIIB-5 and IIIB-6.) Nearly all of the administrative cost in the ATP/coupon system goes to the Federal Reserve system to process coupon deposits. (Retailers and their banks also bear some of this cost, as discussed in Chapters 5 and 7.) The most significant EBT system costs for this function involve totaling retailer credits (\$0.36 per case month) and providing deposit information to retailers (\$0.61 per case month).

¹PDPW's procedures for allocating TXP and Unisys computer costs to the EBT demonstration are discussed in Appendix IIIA.

Exhibit 3-3

Phase C Costs to Credit Retailers:
ATP System vs. EBT System

Task/Item	ATP System Cost per Case Month	Task/Item	EBT System Cost per Case Month
1. Process Coupon Deposits/Oversee FRB Processing		1. Bundle-Up Retailer Credits	
FNS labor	\$<0.01	BIS labor	\$0.05
Federal Reserve		Data processing	0.25
Bank fees	0.16	Indirect cost ¹	<u>0.05</u>
Indirect cost ¹	<u><0.01</u>	Task Total²	\$0.36
Task Total²	\$ 0.16	2. Transmit Credits/ Debit USDA	
Total Cost to Credit Retailers	\$ 0.16	Comptroller labor	\$<0.01
		Bank fees	0.13
		Courier	0.03
		Indirect costs ¹	<u>--</u>
		Task Total²	\$0.16
		3. Provide Deposit Information	
		BCAO labor	\$0.06
		BIS labor	<0.01
		Equipment	0.32
		Telecommunications	0.20
		Indirect costs ¹	<u>0.03</u>
		Task Total²	\$0.61
		Total Cost to Credit Retailers	\$1.13

Notes: ¹See Appendix IIIA for explanation of indirect cost factors.

²Items may not sum to totals due to rounding.

Sources: BCAO time studies, HSH time studies, PDPW and FNS interviews, and PDPW cost reports.

This latter task represents a feature that was added as part of the system redesign for Phase C.

ATP/Coupon System

Processing Coupon Deposits. In the ATP/coupon system, much of the cost of crediting retailers for benefits accepted is borne by the retailers themselves and their banks. Retailers balance their cash drawers, prepare deposit slips and Redemption Certificates, and take their coupons to the bank (along with the cash and checks they have received). The retailer's bank verifies the deposit and the Redemption Certificate, sorts all coupons deposited by denomination and straps them in sets of 100 coupons, completes a Food Coupon Deposit Document, and ships the deposit by courier to the nearest Federal Reserve Bank (FRB) branch.

Under a contract with FNS, the FRB completes the processing of coupon deposits. Before crediting the sending bank, the FRB counts the coupons and checks for counterfeits. The FRB destroys the coupons, debits the FNS account for food stamp benefits, and forwards the Redemption Certificates and Food Coupon Deposit Documents to the FNS Minneapolis Computer Support Center.

Overseeing Coupon Deposit Processing. The FNS Accounting Division receives monthly invoices for coupon processing costs from each FRB district. Accounting Division staff review the invoices and process payments to the FRB.

Costs of Crediting Retailers for Benefits Accepted. FNS bears the \$0.16 per case month cost shown for this function in Exhibit 3-3. Virtually all of this cost goes to the FRB for processing coupon deposits. The total FRB charges for Fiscal Year 1988 are estimated at \$13.7 million.¹

EBT System

Totaling Retailer Credits for Benefit Transactions. Each day after 2:00 p.m., a BIS computer operator runs a series of programs to total or "bundle-up" retailer credits for benefit transactions during the preceding 24

¹Based on actual charges for October 1987 through March 1988.

hours. First, the Tandem TXP produces a copy of the day's log file and a report showing the net credit due each merchant. The operator transfers this file to the Unisys mainframe, which produces a NACHA-format tape of retailer credits and a summary report. The operator checks the Tandem report against the Unisys report and, if the totals match, sends the tape to the tape library. The operator also records the day's retailer credit total on the PDPW voice mail system, where it is accessible to PDPW and FNS project staff.

Transmitting Credits to Retailers and Debiting USDA. A bonded courier picks up the NACHA tape at the PDPW computer center around 3:00 p.m. and delivers it to Commonwealth National Bank (CNB), the EBT system's clearinghouse bank. CNB reads and checks the NACHA tape, merges the data with the day's other entries for the ACH system, and transmits the data to the Philadelphia FRB. The FRB debits CNB's reserve account for the total transmitted and forwards the credits to the retailers' banks, which in turn post them to the retailers' accounts. CNB receives credit for the funds transferred to the retailers by making a wire transfer request against a special USDA letter of credit for the demonstration, which is maintained at the New York FRB. The PDPW Comptroller processes the invoices for the fees paid to CNB for its settlement functions. PDPW pays CNB \$5.00 per business day plus \$0.15 per EBT item transmitted.

Cost of Totaling Retailer Credits, Transmitting Credits, and Debiting USDA. The cost of totaling retailer credits for EBT transactions is \$0.36 per case month, about one-third of the total retailer crediting cost of \$1.13 shown in Exhibit 3-3. The data processing cost for totaling retailer credits is \$0.25 per case month; the rest is BIS labor and indirect costs. The \$0.16 per case month cost of transmitting credits to retailers and debiting USDA includes CNB's fees (\$0.13), as well as courier charges and Comptroller's Office labor costs for processing CNB's invoices.

Providing Deposit Information. The EBT system provides retailers with deposit information in two ways. First, retailers with touch-tone telephone service can call the VIPS to obtain the most recent deposit total. Second, retailers lacking this service can call the BCAO hotline to obtain deposit information. The hotline has access to retailer activity data through the Tandem workstation. The hotline also responds to calls from retailers with questions or problems involving deposits (such as discrepancies between their sales data and credits received).

Costs of Providing Deposit Information. The cost of providing deposit information in the EBT system is \$0.61 per case month, almost 54 percent of the total cost of crediting retailers. The largest component of this cost is equipment lease and maintenance at \$0.32 per case month (including shares of the VIPS and the BCAO and HSH Tandem terminals). Telecommunications costs for the WATS line to the VIPS and the BCAO-HSH link add \$0.20 per case month, while the direct labor cost is only \$0.06 per case month (including BCAO and BIS).

MANAGING RETAILER PARTICIPATION IN THE FOOD STAMP PROGRAM

FNS sets the rules for retailer participation in the Food Stamp Program, authorizes individual firms to participate, monitors redemption activity, and enforces compliance with program regulations. Most of these tasks are performed the same way in the ATP/coupon system and the EBT system, but there are operational differences that lead to differences in cost.

As Exhibit 3-4 shows, the cost of managing retailer participation in the ATP/coupon system is \$0.13 per case month, while the EBT system figure is \$0.33. (Appendix IIIB, Exhibits IIIB-7 and IIIB-8 present detailed system costs for managing retailer participation by agency and cost type.) For this function, the primary cost difference between the two systems arises from additional steps necessary to process the addition of retailers to the EBT system and train new retailers, raising the cost of authorizing and training retailers from the ATP/coupon system level of \$0.02 per case month to \$0.18 per case month in the EBT system. The cost of monitoring redemptions is also slightly higher in the EBT system (\$0.07 per case month versus \$0.03 per case month in the ATP/coupon system).

ATP/Coupon System

Authorizing and Training Retailers. The FNS Philadelphia Field Office (PFO) authorizes retailers wishing to participate in the FSP in Berks County.¹ Retailers submit an application for authorization by mail. The PFO

¹PFO's territory covers southeastern Pennsylvania, southern New Jersey, and Delaware.

Exhibit 3-4

Phase C Costs to Manage Retailer Participation:
ATP System vs. EBT System

Task/Item	ATP System Cost per Case Month	EBT System Cost per Case Month
1. Authorize and Train Retailers		
PFO labor	\$0.01	\$0.01
BCAO labor	--	0.05
Equipment	--	0.02
FNS forms and travel	<0.01	<0.01
Telecommunications	--	0.08
Indirect costs ¹	<u><0.01</u>	<u>0.01</u>
Task Total²	\$0.02	\$0.18
2. Monitor Redemptions		
ADMA labor ³	\$<0.01	\$<0.01
MCSC labor ⁴	0.01	0.02
PFO labor	0.01	0.01
BIS labor	--	<0.01
Redemption Certificate costs ⁴	0.01	--
Other MCSC data processing	<0.01	0.01
Other MCSC costs	<0.01	<0.01
BIS data processing	--	0.01
BIS shipping	--	0.02
Indirect costs ¹	<u><0.01</u>	<u><0.01</u>
Task Total²	\$0.03	\$0.07
3. Enforce Compliance		
ARD labor	\$0.01	\$0.01
CB labor	0.03	0.03
MARO labor	0.02	0.02
PFO labor	<0.01	<0.01
Food Stamp benefits	0.01	0.01
Travel	<0.01	<0.01
Other direct costs	<0.01	<0.01
Indirect costs ¹	<u>0.01</u>	<u>0.01</u>
Task Total²	\$0.08	\$0.08

(continued on next page)

Exhibit 3-4

Phase C Costs to Manage Retailer Participation:
ATP System vs. EBT System
(continued)

Task/Item	ATP System Cost per Case Month	EBT System Cost per Case Month
4. Oversee Redemption System		
RPLS labor ³	\$<0.01	\$<0.01
RWS labor ³	<0.01	<0.01
Publications and travel	<0.01	<0.01
Indirect costs	<u><0.01</u>	<u><0.01</u>
Task Total	\$0.01	\$0.01
Total Cost to Manage Retailer Participation	\$0.13	\$0.33

- Notes: ¹See Appendix IIIA for explanation of indirect cost factors.
²Items may not sum to totals due to rounding.
³See text for explanation of changes in FNS units responsible for retailer management.
⁴"Redemption Certificate costs" include: blank certificates, postage, and equipment lease and maintenance for processing Redemption Certificates and Food Coupon Deposit Documents. "MCSC labor" for ATP system includes labor for processing Redemption Certificates and other redemption monitoring.

Sources: BCAO time studies, HSH time studies, PDPW and FNS interviews, and PDPW cost reports.

Field Representative responsible for the store's area usually interviews the applicant at the PFO or, in the case of large chains with already authorized stores, by telephone. If the application seems questionable, the Field Representative may visit the store. The Field Representative also checks the applicant's previous history of FSP participation, if any. The Officer-in-Charge reviews and approves or denies the application. PFO clerical staff enter the retailer authorization data on the FNS database and send participation supplies (the authorization card, blank Redemption Certificates, and other materials) to the retailer. These supplies (except the Redemption Certificates) are procured by the FNS Information and Records Management Branch.

The PFO Field Representatives also train retailers in compliance with program regulations and redemption procedures. The training covers areas such as procedures for making change in coupons, authorized and unauthorized items, and treatment of loose coupons. Training may occur in the PFO or at the store, if requested by the retailer. Currently authorized retailers may request training of new staff. If a Field Representative has not visited a newly authorized store during the application process, he or she will visit the store after authorization to verify the store's eligibility to participate and compliance with regulations.

Cost of Authorizing and Training Retailers. As shown in Exhibit 3-4, the cost of authorizing and training retailers in the ATP/coupon system is \$0.02 per case month, almost all of which is PFO labor. The remaining direct cost for this task (less than \$0.01 per case month) is the cost of retailer applications, other supplies, and PFO travel.

Monitoring Redemption Activity. The FNS Minneapolis Computer Support Center (MCSC) creates the national food stamp redemption database from the Redemption Certificates (RCs) and Food Coupon Deposit Documents (FCDDs) collected by the Federal Reserve branches, and from the debit vouchers processed by the Treasury Department. MCSC staff use a combination of scanning and key-entry to extract data from the RCs, FCDDs and debit vouchers; the scanners also microfilm the documents.

The MCSC generates a variety of reports from the redemption database. Some reports track general retailer activity, while others focus on problems such as unauthorized redemptions and inactive firms. A computer

model (the Violation Prone Profile or VPP) is used to analyze redemption data and identify stores that may be violating regulations (e.g., selling non-food items or buying coupons for cash). The MCSC also prints and ships blank RCs to retailers, using the data from the completed RCs to determine when a retailer needs a new supply. During Phase C, the FNS Automated Data Management and Analysis Section (ADMAS) had responsibility for maintaining and validating the redemption database.¹

The PFO monitors redemptions by Berks County retailers, using MCSC reports and contacts with retailers. Field Offices are responsible for selecting 25 percent of the retailer sample to be investigated for non-compliance. (The other 75 percent of the sample is selected by the FNS Compliance Branch from the VPP reports and other sources.) Other Field Office activities include responding to retailer questions about the FSP and dealing with blank or incomplete RCs rejected by the MCSC.

Costs of Monitoring Redemptions. Monitoring redemptions in the ATP/coupon system costs \$0.03 per case month, as indicated in Exhibit 3-4. MCSC activity accounts for most of this cost, including \$0.01 per case month in labor and \$0.01 in Redemption Certificate costs, which consist of the supplies, postage and equipment used in providing blank RCs to retailers and processing completed RCs. (The MCSC labor includes RC processing as well as other, more generic redemption monitoring functions.) Outside of the MCSC, PFO labor makes up most of the remaining cost of this task.

Enforcing Compliance with Retailer Regulations. The FNS Compliance Branch (CB) performs undercover investigations of stores that may be violating FSP regulations by accepting coupons for non-food items or exchanging coupons for cash ("trafficking"). Stores found to be in violation of the regulations can be disqualified from participation temporarily or permanently. If disqualification would impose a hardship on recipients (i.e., by eliminating an important source of economical food), a civil money penalty can be assessed instead.

¹In a reorganization that occurred after the Phase C interviews, ADMAS was renamed as the Statistical Support Section. At the same time, the

The CB selects stores for investigation on the basis of reports from the VPP model, tips from informants and law enforcement agencies, and Requests for Investigation submitted by FNS Field Offices. Agents from the six CB Area Offices attempt to purchase unauthorized items or engage in trafficking, either in person or by employing temporary aides from the community. After one or more successful "buys," the agent submits a report to the FNS Regional Office.

Cases of potential non-compliance in Berks County are handled by the FNS Mid-Atlantic Regional Office (MARO) and the PFO. MARO reviews the CB report, sends a warning or a notice of violation (depending on the severity of the case), makes the determination of the applicable sanction, and coordinates any appeals and the actual sanction. The PFO receives the retailer's response to the warning or notice, provides background information for the sanction decision, assists in any appeals, and implements the sanction. The PFO also visits stores to investigate "whistle-blower" complaints by store employees or other direct allegations of violations.

The FNS Administrative Review Division (ARD) has regional officers that hear appeals of retailer disqualifications and other FNS administrative actions. (Nearly all of the ARD caseload involves food stamp retailers.) Retailers can appeal sanctions without an attorney and without paying any fees; most do. ARD decisions can be appealed in the federal courts, and FNS is required to pay court costs if a sanction is overruled.

Compliance Enforcement Costs. The cost of compliance enforcement in the ATP/coupon system is \$0.08 per case month, as shown in Exhibit 3-4. The CB is the major source of these costs, spending \$0.03 per case month on labor and \$0.01 per case month on food stamp benefits used in investigations. MARO labor costs for compliance enforcement are \$0.02 per case month, and ARD labor costs are \$0.01 per case month. Travel costs for compliance enforcement are incurred by CB, MARO and ARD.¹

Overseeing the Redemption System. During Phase C, oversight of the food stamp redemption system was divided between two FNS units: the Retailer

¹These costs do not include related investigations by the USDA Office of Inspector General, for which data were unavailable.

Participation and Litigation Section (RPLS) and the Retailer-Wholesaler Section (RWS).¹ RPLS was responsible for designing retailer forms, maintaining regulations, and clarifying regulations and agency policy on retailer participation. RWS monitored the operation of the redemption system and the compliance enforcement process, looking for possible administrative improvements or needs for regulatory or legal changes. RWS also published program information for retailers.

Costs of Overseeing the Redemption System. The cost of FNS oversight of the redemption system is \$0.01 per case month. This cost consists of labor, printing charges, and indirect costs. As Exhibit 3-4 shows, the RWS labor cost is less than \$0.01 per case month, as is the RPLS labor cost.

EBT System

Authorizing and Training Retailers. PFO follows basically the same process in authorizing a retailer in the EBT demonstration area as in authorizing a retailer to participate solely in the ATP/coupon system. When PFO authorizes a retailer in the demonstration area, however, the Office-in-Charge sends a form to BCAO indicating that the retailer should be offered the opportunity to participate in the EBT system. PFO generally takes applications from Reading retailers in person, rather than in the office. This policy does not materially affect the Field Representative's workload, since he would have to visit the store after authorization otherwise.

The lead BCAO hotline worker coordinates the addition of authorized retailers to the EBT system. (While hotline coverage is shared among several caseworker supervisors, one of these individuals is assigned as the primary retailer contact.) When this worker receives the approval form from PFO, he or she visits the retailer to explain the EBT demonstration and determine the requirements for installation of telephone lines, BTTs and printers. (This installation process was previously discussed as part of maintaining the

¹Under the current FNS organization, RWS is now the Retailer Monitoring Section (RMS), and RPLS no longer exists. All redemption system oversight has been consolidated within the Benefit Redemption Division, which includes CB and RMS.

terminal network.) The hotline worker also obtains banking data from the retailer and has the retailer sign the ACH pre-notification form granting permission to send credits via the ACH to the retailer's bank account. Next, the worker enters the retailer's account number and other data into the EBT system. Finally, once the store is ready to process sales, the worker issues the store's EBT cards (for signing on terminals and authorizing refunds) and returns to the store to train the retailer's staff. If the store's bank or account number changes, the hotline worker must update the EBT system file and arrange for a new ACH form to be submitted.

Costs of Authorizing and Training Retailers. The cost of authorizing and training retailers in the EBT system is \$0.18 per case month, substantially more than in the ATP/coupon system, as shown in Exhibit 3-4. The PFO costs for this task (\$0.01 per case month for labor and less than \$0.01 for indirect costs) are the same in both systems; the difference lies in the BCAO costs. The largest component of the BCAO cost is \$0.08 per case month for the applicable share of telecommunications costs for the BCAO-HSH link supporting BCAO's Tandem terminal. BCAO labor for this task amounts to \$0.05 per case month.

Monitoring Redemptions. Retailers do not complete Redemption Certificates for EBT sales, so the EBT system provides the necessary data for redemption monitoring in another fashion. When the Unisys mainframe creates the tape of retailer credits, it also creates a file of redemption data for FNS. Each Friday and on the last day of the month, BIS staff copy this file onto tape and ship it to the MCSC, where the data are read and merged into the main redemption database. An analyst at MCSC checks the PDPW tape against the daily letter of credit activity at the New York FRB. (Further FNS reconciliation activities are discussed under the "Reconciliation and Monitoring" function.) Aside from these special activities, MCSC, PFO and ADMAS activities for monitoring redemptions during Phase C were the same as in the ATP/coupon system.

Costs of Monitoring Redemptions. As Exhibit 3-4 indicates, redemption monitoring costs \$0.07 per case month in the EBT system. The BIS direct costs for this task include labor, data processing and shipping, totalling \$0.03 per case month. MCSC labor for this task is \$0.02 per case month, more than twice the ATP/coupon system figure, because of the cost of loading the

tape and reviewing the data. Reading the tape is also the source of the increased MCSC data processing cost under the EBT system. The PFO and ADMA costs for EBT redemption monitoring are the same as in ATP/coupon system.

Compliance Enforcement and Redemption System Oversight. The FNS units responsible for compliance enforcement perform essentially the same tasks in the EBT system as in the ATP/coupon system. The only difference between the systems in this regard is that instead of using coupons provided by the CPSU, CB agents must have EBT cards and active accounts with benefits to make buys in Reading. To safeguard the identities of investigators, a senior BCAO official is assigned to provide these resources when requested by the CB. The redesigned EBT system can track FNS investigative accounts separately to facilitate case documentation and reconciliation of benefits used for investigations. The redemption system oversight tasks performed during Phase C by the RPLS and RWS were unaffected by the EBT system. However, FNS officials responsible for redemption might become involved in issues such as standards for equipping and servicing retailers if EBT systems became widespread.

Costs of Enforcing Compliance and Overseeing the Redemption System. No compliance investigations of EBT demonstration stores were performed during the Phase C data collection period, so the only basis for estimating costs for this task is the data on ATP/coupon system costs. (This approach is reasonable given the fact that the chief factor governing compliance investigation costs is the CB budget.) Therefore, the estimated compliance enforcement cost for the EBT system is \$0.08 per case month, as shown in Exhibit 3-4. (BCAO's involvement in compliance enforcement has been too infrequent to estimate the incremental cost of this task under the EBT system.) Similarly, the redemption oversight cost measured for the ATP/coupon system (\$0.01 per case month) is also assigned to the EBT system.

RECONCILING AND MONITORING ISSUANCE SYSTEM ACTIVITY

In both the ATP/coupon system and the EBT system, the tasks required to reconcile and monitor issuance system activity involve both PDPW and FNS. ATP/coupon system activities center around detecting ATP and coupon losses in the issuance process. EBT system activities reconcile actual and authorized issuances, but they also balance the entire flow of benefits from issuance through redemption.

Exhibit 3-5 shows that EBT system costs for this function are, at \$2.10 per case month, substantially higher than ATP/coupon system costs, which are only \$0.23 per case month. (Appendix IIIB, Exhibits IIIB-9 and IIIB-10 provide detailed system costs by agency and type for reconciliation and monitoring tasks.) The high cost of technical support and other oversight of EBT system operations, totaling \$1.78 per case month, accounts for nearly all of this difference. The demonstration environment is the source of at least some of this differential.

ATP/Coupon System

Reconciling Benefit Issuances. Each month, BIS receives shipments of canceled ATPs and coupon inventory reports (FNS-250 forms) from issuance agents. BIS Data Analysts send a copy of each FNS-250 to the Food Stamp Section (FSS), remove damaged and manually prepared ATPs from the shipments, and sort the ATPs and FNS-250s for processing. BIS Computer Operators key-enter the total from each FNS-250 and run the ATPs from the bank through a Burroughs Optical Character Recognition (OCR) scanner. The OCR reads the case data, allotment amount and ATP number, and generates a tape file. The operator keys data from any ATPs that the OCR rejects. A contractor key-enters that data from the damaged and manually prepared ATPs. The PDPW mailroom receives ATPs returned by the Postal Service, cancels them, and sends them to BIS for scanning. The PDPW Division of Management Consulting Services (DMCS) contracts out the microfilming of canceled ATPs and coordinates the subsequent storage of the ATPs in the PDPW warehouse.

After loading the OCR and key-punch files onto the Unisys mainframe, BIS operators run a series of programs to balance each bank's reported issuance total (on the FNS-250) with the total value of its canceled ATPs. BIS Data Analysts review the reports generated and attempt to determine the causes of any imbalances. (OCR or key-entry errors may introduce an apparent imbalance when the actual documents are consistent.) If BIS staff cannot balance a bank, they send the data to the FSS.

Once the ATPs from a bank have been balanced with its FNS-250, BIS runs another series of programs to compare the ATPs transacted with the authorized issuances for the month. BIS Data Analysts review the reports of "unmatched" ATPs to detect any processing errors, such as erroneous entry of

Exhibit 3-5

**Phase C Costs to Reconcile and Monitor Issuance System:
ATP System vs. EBT System**

Task/Item	ATP System Cost per Case Month	Task/Item	EBT System Cost per Case Month
1. Reconcile Issuances		1. Reconcile Issuances	
BIS labor	\$0.05	BIS labor	\$ 0.01
DMCS labor	<0.01	Data processing	<0.01
FSS labor	0.02	Printing	<0.01
Contract data entry	<0.01	Indirect costs ¹	<u>0.01</u>
Data processing	0.06	Task Total²	\$ 0.07
Microfilming contract	0.05		
Printing and space	<0.01	2. System Reconciliation	
Indirect costs ¹	<u>0.02</u>	BIS labor	\$ 0.04
Task Total²	\$0.21	AD labor	0.01
2. Report Issuance Losses		BD labor	<0.01
FSS labor	\$<0.01	RDPS labor	0.05
IRMD labor	<0.01	Data processing	0.12
MARO labor	<0.01	Indirect cost ¹	<u>0.04</u>
Data entry contract	<0.01	Task Total²	\$ 0.25
Data processing	<0.01		
Indirect costs ¹	<u><0.01</u>	3. Report System Activity	
Task Total²	\$ 0.01	BIS labor	\$<0.01
3. Oversee Issuance System		Data processing	0.01
ADMA labor ³	\$<0.01	Indirect costs ¹	<u><0.01</u>
MARO labor	<0.01	Task Total²	\$ 0.01
PES labor ³	<0.01	4. Oversee System Operations	
PID labor	<0.01	BIS labor	\$0.79
SMS labor ³	<0.01	DPSP labor	0.39
Travel	<0.01	Equipment	0.12
Indirect costs ¹	<u><0.01</u>	Indirect costs ¹	<u>0.48</u>
Task Total²	\$ 0.01	Task Total²	\$1.78
Total Cost to Reconcile and Monitor Issuance System	\$ 0.23	Total Cost to Reconcile and Monitor Issuance System	\$2.10

(see next page for notes)

Exhibit 3-5

Phase C Costs to Reconcile and Monitor Issuance System:
ATP System vs. EBT System
(continued)

Notes: ¹See Appendix IIIA for explanation of indirect cost factors.
²Items may not sum to totals due to rounding.
³See text for explanation of changes in FNS units responsible for issuance oversight.

Sources: HSH time studies, PDPW and FNS interviews, and PDPW cost reports.

authorization file data for a manually prepared ATP. Reports of multiple canceled ATPs for a single authorization (e.g., when both the original ATP and a replacement are transacted) are sent to the County Assistance Offices for review.

The FSS performs the final reconciliation of issuances and submits the ATP issuance loss (FNS-46) report to the FNS Regional Office. This process may require contacts with "out-of-balance" banks, as well as review of the reports generated by BIS. Twice a year, FSS computes each issuance agent's liabilities for coupon and ATP losses, and offsets the agent's fees by that amount.

Costs of Reconciling Issuances. Out of a total reconciliation and monitoring cost of \$0.23 per case month for the ATP/coupon system, the cost of reconciling issuances is \$0.21 per case month, as shown in Exhibit 3-5. BIS accounts for most of the cost of this task, including labor (\$0.05 per case month), data processing (\$0.06 per case month), contract data entry and other costs. The DMCS costs are the contract for microfilming ATPs (\$0.05 per case month) and related DMCS labor.

Reporting Issuance Losses. In addition to the reconciliation activity described above, FSS prepares the final coupon inventory report (FNS-250) for the state of Pennsylvania and submits it to MARO. FSS also destroys damaged coupons returned by issuance agents and County Assistance Offices, documenting the number and quantity in another report to FNS.

MARO processes FNS-250, FNS-46 and mail issuance loss (FNS-259) reports submitted by the States in the region. A clerk receives the reports and prepares them for key-entry. An on-site contractor enters the report data directly to the national FNS databases for the issuance loss reports. MARO staff also enter the FNS-46 and FNS-259 data onto a MARO database for use in billing States for their liabilities. (MARO intends to develop a process to download billing data from the national databases so that this second entry step is not necessary.) The FNS Information Resources Management Division (IRMD) maintains the issuance loss databases and generates reports from them.

Overseeing Issuance System Operations. At MARO, the Coupon Issuance and Accountability Unit (CIAU) performs several oversight tasks with respect to issuance system operations. CIAU staff monitor States' loss rates and

other performance dimensions through review of loss reports and periodic on-site reviews of issuance and reconciliation operations. These staff are also responsible for billings to the States for issuance losses documented on the FNS-46 and FNS-259 reports.

During Phase C, several national-level FNS units oversaw issuance system operations. The State Management Section (SMS) maintained regulations and forms, and interpreted policy and regulations in response to Regional Office and State queries. The Program Evaluation Section (PES) monitored the operation of State issuance systems and supervises the Regional Offices' oversight activities. The Automated Data Management and Analysis Section (ADMAS) analyzed issuance reconciliation data and provided administrative support for the board that hears States' appeals of issuance loss billings. Finally, the Program Information Division (PID) monitored the quality of the FNS-250, FNS-46 and FNS-259 databases and used the data to validate program participation estimates from other (non-issuance-oriented) reports.¹

Costs of Reporting Issuance Losses and Overseeing Issuance Systems. The cost of reporting issuance losses is \$0.01 per case month, as shown in Exhibit 3-5; overseeing issuance systems adds \$0.01 per case month. The largest component of the reporting cost is MARO's data entry contract. Other direct costs for this task are MARO labor, PDPW Food Stamp Section labor, and IRMD labor and data processing. MARO's issuance oversight labor cost is less than \$0.01 per case month; MARO also incurs a small travel cost for its on-site issuance reviews. ADMA, PES, PID, and SMS labor account for the rest of this task's direct costs.

¹Under the 1988 FNS reorganization, SMS assumed ADMAS' responsibility for analysis of reconciliation data and administrative support on appeals of loss billings. The Issuance and Accountability Section (IAS) assumed SMS' former responsibility for issuance regulations, forms, and policy. IAS also took over PES' responsibility for monitoring State issuance operations and FNS Regional Office oversight of issuance. PES is now the State Monitoring and Evaluation Section. PID's role remains the same.

EBT System

Reconciling Issuances. When BIS posts benefits to client accounts, the Tandem TXP generates an acknowledgment file in the same format as the files of canceled ATP data produced by the OCR in the ATP/coupon system. The computer operator loads the EBT acknowledgment file onto the Unisys mainframe, where it is later merged with the canceled ATP data to be reconciled against the issuance authorization data for each household. Once the EBT data are merged with the rest of the reconciliation data, they are treated as if the benefits were issued via ATPs and included in the FNS-46 report (but not the FNS-250). The systems analyst responsible for the EBT software checks the issuance summary report generated by the Tandem against another report produced by the Unisys mainframe when it reads the acknowledgment tape.

Reconciling System Balances and Benefit Flows. To reconcile EBT system balances and benefit flows, BIS extracts the history file from the Tandem once a day (shortly after midnight). A BIS operator loads this file onto the Unisys mainframe and runs a series of reconciliation programs. Reports generated by this process reconcile individual recipient and retailer balances, identifying any discrepancies, and check the total funds remaining in the system against the life-to-date flows into and out of the system. A BIS data analyst checks the reconciliation reports the next weekday morning and reports any discrepancies to one of the two software support staff assigned to the project. One of these staff also reviews the reconciliation reports each day.

FNS staff also perform system reconciliation tasks as part of their responsibility for funding the Letter of Credit (LOC) containing the demonstration's benefit money. Staff in the Research and Demonstration Projects Section (RDPS) prepare a request for funding for the LOC each month, based on expected sales. The Budget Division and the Accounting Division review the request and authorize the release of funds. The RDPS and Accounting Division staff monitor LOC activity, using data from PDPW, the MCSC, and the New York Federal Reserve Bank.

RDPS staff work with PDPW to resolve the occasional discrepancies between the retailer credits authorized by the EBT system and Commonwealth National Bank's wire requests against the LOC. Such discrepancies occur about once a month (on average) and usually involve a transposed digit in the wire

funds request (e.g., requesting \$1,500 instead of \$1,050). To determine the source of the discrepancy, PDPW and Commonwealth National Bank (CNB) staff compare the EBT system's reports on retailer credits with CNB's accounting system and the wire funds request. CNB usually corrects discrepancies by adding to or subtracting from future wire funds requests against the LOC (although this process occasionally creates new discrepancies).

Costs of Reconciling Issuances, System Balances and Benefit Flows.

The costs of reconciling issuances, system balances and benefit flows make up a small part of the \$2.10 per case month cost of reconciliation and monitoring in the EBT system, as shown in Exhibit 3-5. The cost for reconciling issuances is estimated at \$0.07 per case month, based on the labor, data processing, printing and indirect costs associated with reconciliation programs run on PDPW's Unisys mainframe.¹ The cost of reconciling system balances and benefit flows is \$0.25 per case month, of which \$0.18 per case month is BIS data processing, labor, and related indirect costs. The FNS cost is \$0.06 per case month, mostly for RDPS labor. This cost includes other FNS oversight, such as monitoring system operations and responding to questions or problems involving operations.

Reporting System Activity. On the first day of a new month, the EBT system operator runs a series of programs on the Unisys mainframe to generate activity reports for the previous month. This process uses the data from the cumulative Tandem history file extracted for reconciliation purposes. The reports analyze system use and problems experienced by recipients and retailers. BIS stores the history file for audit trail purposes.

The cost of reporting EBT system activity is \$0.01 per case month, as shown in Exhibit 3-5. Processing charges account for almost all of this cost.

Overseeing System Operations. PDPW's management team for the EBT project consists of the two BIS technical support staff and several program staff of the Division of Planning and Specialized Programs (DPSP).

¹This estimate probably overstates the EBT system cost, since some of the data processing cost involves balancing ATP data against FNS-250 data. PDPW does not separately track data processing costs for EBT issuance reconciliation. The amount of error is probably quite small, given the size of the data processing cost.

The BIS systems analyst and programmer perform a variety of monitoring and problem-solving tasks. They review the numerous system reconciliation reports on a daily basis, extract and examine system performance data, and analyze the monthly system activity reports. These staff worked extensively on fixes and modifications to the redesigned software from the beginning of Phase C until the major problems were resolved in February, 1988, and they have continued to work on enhancements to make operations more efficient. As the in-house experts on the EBT system software, they are responsible for technical support to BCAO (especially around the Tandem terminal), investigating problems (such as the high rate of transaction reversals during late 1987 and early 1988), and producing ad hoc reports from EBT system data upon request by DPSP, BCAO, or other parties.

The EBT unit at DPSP oversees BCAO operations, responds to FSP regulatory and policy issues, monitors BIS operations, and serves as liaison with FNS and the financial institutions. (The EBT unit also facilitates the evaluation and is involved in PDPW's plans to enhance and expand the EBT system. Neither of these activities is considered part of the operational oversight cost.) Part of this unit's role in operations involves routine oversight, such as review of daily reconciliation reports. DPSP staff regularly respond to policy questions or operational problems presented by BCAO. The EBT unit works with the clearinghouse bank and (if necessary) with BCAO and BIS to resolve problems with returned ACH credits (e.g., because of incorrect retailer information), the pick-up and processing of ACH tapes, and transfers from the LOC. While day-to-day retailer liaison is BCAO's responsibility, DPSP becomes involved whenever formal correspondence from PDPW to the retailer community is needed, such as the letter notifying retailers of the temporary system shut-down in May 1988.

Some of DPSP's operational responsibilities would be reduced or eliminated if the EBT project ceased to be a demonstration. DPSP staff prepare the monthly progress report for FNS (with BIS input), work with FNS on policy issues (such as redemptions by homeless meal providers), and respond to frequent inquiries about the project from State Agencies, the media, and other interested parties.

Costs of Overseeing System Operations. At \$1.78 per case month, this is the most costly reconciliation and monitoring task in the EBT system

(see Exhibit 3-5). BIS direct labor costs account for \$0.79 per case month, and the Tandem workstation used by these staff adds \$0.12 per case month. DPSP direct staff costs total \$0.39, including professional staff and clerical support.

The costs of overseeing system operations reflect a staffing structure that was established for overseeing the implementation and early operations of the redesigned EBT system. This process required much more attention from senior DPSP and BIS staff than would be needed in a mature non-demonstration EBT system. The EBT system still required extra oversight effort after a year of Phase C operations, because of the demonstration setting, the recent expansion, and the outstanding issues from the implementation process. However, the staffing structure remained designed to assure the ready availability of staff with in-depth knowledge of the EBT system -- a desirable arrangement, but one with a substantial cost.

SUMMARY OF PHASE C COSTS FOR THE ATP/COUPON SYSTEM AND THE EBT SYSTEM

Exhibit 3-6 summarizes Phase C administrative costs by function for the ATP/coupon system and the EBT system. As indicated at the beginning of this section, Phase C administrative costs for the EBT system are \$9.14 per case month, more than three times the \$2.74 per case month cost of the ATP/coupon system.

The most expensive function in each system is delivering benefits. In the ATP/coupon system, the \$1.43 per case month cost of this function includes supplying coupons and paying issuance agents to exchange coupons for recipients' ATPs. In the EBT system, the \$3.83 per case month total for delivering benefits includes processing routine transactions, resolving transaction problems, maintaining the terminal network, and providing recipient balance information.

Aside from benefit delivery, the major costs in both systems involve authorizing access to benefits and reconciling benefit issuance. In the ATP/coupon system, producing ATPs, mailing them, resolving ATP-related client problems, and processing canceled ATPs are the major activities under these functions. In the EBT system, issuing benefit cards, training recipients to use the system, posting benefits to recipient accounts, and oversight of operations are the costly tasks for the same functions.

Exhibit 3-6

Summary of ATP and EBT System Administrative
Costs in Phase C of the Extended Demonstration

Function	ATP System Cost per Case Month	EBT System Cost per Case Month
Authorize Access to Benefits	\$0.80	\$1.74
Deliver Benefits	1.42	3.83
Credit Retailers	0.16	1.13
Manage Retailer Participation	0.13	0.33
Reconcile and Monitor Issuance System	<u>0.23</u>	<u>2.10</u>
Total System Costs	\$2.74	\$9.14

Note: Items may not sum to totals due to rounding.

Sources: BCAO time studies, HSH time studies, PDPW and FNS interviews, and PDPW cost reports.

Despite the 20 percent expansion of the EBT caseload in Phase C, the relatively small scale of the demonstration nonetheless contributes to its high administrative costs. In the ATP/coupon system, fixed costs such as FNS oversight are spread over very large caseloads. In the EBT system, the Tandem and Unicom processors are shared with other PDP-11s in the State of Tennessee.

Expanding the EBT system would, of course, entail costs for installing additional terminals and telephone lines, issuing cards, training recipients and retailers, and other implementation activities. Whether the cost savings realized by expansion would offset these implementation costs is beyond the scope of this study. Previous analyses, however, have suggested that expansion alone may not reduce EBT system administrative costs to the level of the ATP/coupon system.¹ Even when large economies of scale in data processing and project management are assumed, EBT system operating costs are likely to remain high as long as the FSP bears the full cost of providing POS equipment and separate EBT telephone lines to all authorized grocers. At the prevailing prices for these resources, the average store's food stamp redemption volume is too low to use them efficiently. In the PDPW EBT system, the average terminal processes fewer than 100 transactions per month.

To reduce the \$2.87 per case month cost of maintaining the EBT terminal network, it would be necessary to cut expenditures and maintenance

An integrated EBT/commercial POS system would use POS equipment more efficiently, reducing the resource cost per transaction. For example, food stamp transactions are about 5 percent of all purchases in Reading stores.¹ If the EBT terminal network costs were shared in proportion to transaction volume, a POS network that captured 5 percent of non-food stamp transactions would absorb 49 percent of the terminal network costs, reducing the FSP cost to \$1.47 per case month. If the POS network handled 10 percent of non-food stamp transactions, the FSP cost would be \$0.99 per case month.² This example should be viewed as suggestive of possible savings from EBT/POS integration, since actual savings would depend on negotiations over cost-sharing between POS terminal deployers and FSP officials.

Sharing costs with other government assistance programs is another route to lowering FSP costs for an EBT system. A multi-program EBT system would allow cost-sharing for most tasks including card issuance, benefit posting, transaction processing, terminal deployment, settlement, and reporting. For example, if 50 percent of food stamp households receive public assistance, then one-third of all food stamp card issuance costs could be allocated to other programs (assuming an allocation based on case counts). Savings from sharing POS equipment would be smaller, because clients are likely to make fewer cash transactions in total, and some of those transactions might be made at automatic teller machines (ATMs) instead of POS terminals. For example, if each food stamp household makes 8 POS transactions per month and each cash household makes 2 POS transactions per month (in addition to 2 ATM transactions per month), the FSP share would be eight-ninths (or 89 percent) assuming that 50 percent of food stamp households are PA

¹Approximately 8 percent of checkout transactions observed for this evaluation were EBT or coupon transactions. This figure probably overstates the average, since observations were conducted during the days following food stamp issuance. A Food Marketing Institute (FMI) survey found that food stamp purchases were about 1-2 percent of all transactions in the supermarkets that responded. (Food Marketing Institute, Check, Cash and EFT Transactions 1989: A Cost Analysis for the Supermarket, Washington, DC: (author), 1989).

²The FMI survey found that EFT transactions were about 6 percent of all purchases in EFT-equipped stores.

households.¹ Other resources that would be more fully utilized in a multi-program EBT system include the VIPS, the HSH workstation, and oversight staff.²

EBT system operating costs are affected by another feature of the demonstration environment: the need to devote extra effort to preventing, detecting and resolving problems. For example, all recipients are still trained formally in groups, using the same video and script as were used during the original demonstration, to ensure that they are well prepared to use the system. BCAO staff have suggested that formal training could be optional (as it is now for prior EBT system users who return to the FSP), given the widespread familiarity with the system in Reading. A brief training process at the time of card issuance, including practice to verify the recipients' understanding, would still be advisable.

Another special problem-resolution cost relates to the hotline to deal with equipment and transaction problems, perform manual sales, and answer questions about deposits. This is in part the result of the high standard of retailer service established by PRC and maintained by PDPW. Under this standard, numerous informal procedures were developed to accommodate retailers, such as the verification of individual transactions and the daily retrieval of deposit data for merchants who lack touch-tone service.

In addition, the visibility of the demonstration and the novelty of its problems lead to a high level of DPSP effort for system oversight. For example, DPSP had to work out a procedure and obtain permission from four retailers and FNS to recover a total of \$18.44 in excess credits, a process that took several months to complete. As discussed earlier, DPSP and BIS oversight staff spend a great deal of time verifying that the system is in

¹The assumption on cash transactions per case month is derived from data from the Electronic Benefit System demonstration in Ramsey County, Minnesota, where AFDC and other public assistance recipients use ATMs and POS devices to obtain their benefits.

²Detailed cost models for FSP-only and multi-program EBT/commercial POS systems are analyzed in John A. Kirlin et al., The Feasibility of a Nationwide Electronic Benefit Transfer System for the Food Stamp Program, Cambridge, Massachusetts: Abt Associates Inc., (forthcoming).

balance and completing tasks that remain from system implementation, in addition to dealing with operational problems.

The DPSP and BIS oversight costs are more likely than the training and hotline costs to decline as the system matures. Less BIS oversight effort will be needed as system enhancements are completed and all parties become confident that the reconciliation process is reliable. Both units will devote less time to devising solutions to problems as they gain more experience and build up a set of precedents for problem resolution. Hotline costs could be cut somewhat by eliminating "discretionary" services, but these are a small part of the cost compared with equipment problems and manual sales. It is unclear how much card issuance and training costs could actually be reduced, given the need for expedited service.

All of these PDPW labor costs (with the associated indirect costs) make up only 34 percent of all EBT system operating costs. The largest components -- terminal installation and repair, telecommunications, and computer hardware -- are not likely to decline as long as the scale and configuration of the EBT system remain the same.

3.2 **COMPARISON OF PHASE C EBT OPERATING COSTS WITH COSTS DURING PHASE B AND THE ORIGINAL DEMONSTRATION PERIOD**

One of the key questions to be answered by the extended EBT demonstration was how much EBT system operating costs would be reduced by PDPW's takeover, relocation and redesign of the system. These changes were expected to cut operating costs by permitting the sharing of staff and hardware with other applications and by reducing the effort required to operate and troubleshoot the system. The FNS buyout of the leases on the terminals was expected to result in much lower monthly costs for this major part of the system.

Exhibit 3-7 compares the redesigned (Phase C) EBT system's operating costs with costs of the relocated (Phase B) and original demonstration EBT systems.¹ This exhibit illustrates how the relocation and redesign of the EBT system affected EBT system operating costs.

¹The original demonstration data are drawn from calculations for the table in William L. Hamilton et al., op. cit., p. 66.

Exhibit 3-7

Comparison of Detailed EBT System Operating Costs in the
Original Demonstration, Phase B and Phase C Periods

Cost Element	Original Demonstration Cost per Month	Phase B Cost per Month	Phase C Cost per Month
Food Stamp Program Costs:			
Benefit issuance and reconciliation labor ¹	398	56	70
Issuance and reconciliation data processing ¹	614	399	463
BCAO labor and indirect costs ²	2,312	3,924	3,820
BCAO workstation ³	615	222	545
Photo ID equipment	174	146	155
Blank ID cards/other training costs ²	119	188	321
FNS retailer management ¹	538	456	572
FNS project oversight ¹	432	902	276
DPSP management and policy ²	795	1,040	1,699
PDPW indirect (non-BCAO)	<u>100</u>	--	--
Total Food Stamp Program Costs	\$6,097	\$7,333	\$7,922
Cost per Case Month	\$1.80	\$1.97	\$1.87
Database/EBT Center Costs:			
Hardware/computer usage ¹	13,845	1,308	6,733
Operator and supervisor labor ²	14,801	1,555	562
Hotline labor ⁴	--	1,186	1,345
Technical support ²	5,379	802	5,666
Maintenance contracts	1,765	2,392	--
ACH fees and tape courier	758	624	692
Other costs (rent, etc.)	3,596	224	232
Management labor ⁵	3,950	63	--
Indirect cost	<u>4,020</u>	--	--
Total Database/EBT Center Costs	\$48,113	\$8,154	\$15,230
Cost per Case Month	\$14.23	\$2.19	\$3.59

(continued on next page)

Exhibit 3-7

Comparison of Detailed EBT System Operating Costs
in the Original Demonstration, Phase B and Phase C Periods
(continued)

Cost Element	Original Demonstration Cost per Month	Phase B Cost per Month	Phase C Cost per Month
Terminal & Communications Costs:			
Terminals and printers	23,019	2,403	2,403
Installation and repair ⁶	6,965	6,271	6,470
Communications	4,302	3,926	6,739
Grocer message units ⁷	224	--	--
Indirect cost	<u>3,306</u>	--	--
Total Terminal and Communications Costs	\$37,815	\$12,599	\$15,612
Cost per Case Month	\$11.19	\$3.39	\$3.68
GRAND TOTAL COSTS	\$92,026	\$28,086	\$38,765
COST PER CASE MONTH	\$27.22	\$7.55	\$9.14
(Average caseload)	(3,381)	(3,718)	(4,241)

Notes: ¹ Includes indirect costs for Phases B and C.

² Includes indirect cost for all periods.

³ Includes indirect cost for Phase C only.

⁴ Hotline labor and indirect cost included in operator and supervisor labor for original demonstration.

⁵ Management labor and indirect cost for Phase C included in technical support.

⁶ Includes indirect cost only for original demonstration.

⁷ Grocer message units not available for Phases B and C.

Items may not sum to totals because of rounding.

Sources: Original demonstration costs from Hamilton *et al.*, *op. cit.*, Appendix III. Extended demonstration costs from BCAO and HSH time studies, PDPW and FNS interviews, and PDPW cost reports.

The exhibit divides the data into three sets of functions that are useful in comparing EBT system costs:

- Food Stamp Program functions, which are the special activities required by the FSP, including recipient services (excluding hotline response to recipient calls), FNS retailer management, and PDPW and FNS project oversight.
- Database/EBT center functions are those performed by the system's processors and the staff that operate them. Technical support, hotline operations and other retailer interface activity also fall under this category.
- Terminal and communications functions include the deployment and maintenance of store hardware and communications lines.

As Exhibit 3-7 shows, EBT system operating costs fell dramatically from \$27.22 per case month during the original demonstration to \$7.55 per case month during Phase B. The largest drops were in database/EBT center labor and store equipment and service costs. The Phase C cost of \$9.14 per case month is slightly higher than Phase B costs, reflecting increases in database/EBT center labor and hardware and in communications services. The cost differences among the three periods of EBT system operation are discussed below in terms of the three functional areas.

FOOD STAMP PROGRAM COSTS

Food Stamp Program functions changed little when the demonstration was extended. BCAO continued to issue benefit cards, train new recipients, and respond to issuance-related problems. BIS generated allotment files for transfer to the EBT database and maintained the necessary software. DPSP acquired responsibility for programmatic oversight of computer operations, the hotline, and interface with the clearinghouse bank, in addition to ongoing oversight of BCAO's EBT system activities. FNS's generic retailer management activities were unaffected, and FNS project oversight simply shifted from the original demonstration contractor (PRC) to PDPW. The redesign of the system did not change any of these functional roles, although some of the hardware used by BCAO was changed.

For these reasons, it is not surprising that the FSP cost rose only slightly from \$6,097 per month in the original demonstration to \$7,922 per

month in Phase C. The Phase C figure translates to \$1.87 per case month, which is quite close to the original demonstration cost of \$1.80 per case month; the Phase B level is higher, at \$1.97 per case month.

The rise in FSP costs from the original demonstration to Phase B was due to increases in all three categories of labor: BCAO, PDPW management, and FNS oversight. The greatest part of this increase came in BCAO labor, which rose by \$0.37 per case month. The increases in other labor costs were offset by a reduction in non-labor costs resulting from the equipment buyout.

The FSP cost per case month fell from Phase B to Phase C because of the Phase C caseload expansion and reductions in BCAO labor and FNS oversight costs. The expansion provided a larger base over which costs that are independent of scale, such as FNS and PDPW oversight, could be spread. At BCAO, reductions in clerical effort and overhead costs offset increases in other labor categories. The increase in state and local non-labor costs was due to the replacement of the original IBM personal computer workstation (which was purchased at a fraction of original cost) with a new, leased Tandem terminal.

DATABASE/EBT CENTER COSTS

Total database/EBT center costs for Phase B were one-sixth of the total original demonstration cost, as shown in Exhibit 3-7. As expected, labor costs fell dramatically when the EBT system was relocated to the PDPW computer center, where operators were already available on a 24-hour basis. Unlike the PRC staff, the PDPW operators could perform non-EBT tasks when the system was just processing transactions and while waiting for batch processes to finish. PDPW's assumption of responsibility also reduced the level and cost per hour of technical support and operations management. And by purchasing the previously leased hardware, FNS cut this cost component by 91 percent.¹

¹The Phase B EBT center hardware cost of \$1,308 represents the monthly payment to amortize the buyout cost of \$50,290 over the equipment's remaining life of 42 months, at a 5-percent opportunity cost of capital. If the purchase were amortized over the 16 months of Phase B, the monthly payment would be \$3,256. See Appendix IIIA for further information on amortization methods.

The Phase C cost of database/EBT center functions is \$15,230, or \$3.59 per case month, a 64-percent increase from the Phase B figure of \$2.19 per case month. The total operational labor cost for database/EBT center functions (including computer operations and the hotline) actually fell by \$0.29 per case month from Phase B to Phase C, but this change was offset by a \$1.12 per case month increase in technical support costs. Even after a year of redesigned system operations, the PDPW project analysts still monitor day-to-day operations closely and must frequently respond to technical questions and problems. As previously discussed, much of this effort represents an extension of the level of oversight and support required during Phase C system implementation.

Although database/EBT center hardware costs rose considerably from Phase B to Phase C, they remain well below the original demonstration level. Only one-fourth of the \$6,733 (or \$1.59 per case month) cost of Phase C database/EBT center hardware represents usage charges for the Tandem and Unisys processors (including applicable indirect costs). The leases, maintenance and indirect costs for the HSH Tandem terminals and VIPS unit used exclusively for the EBT system make up the rest.

TERMINAL AND COMMUNICATIONS COSTS

When PDPW took over EBT system operations, three key features of the terminal and communications functions were changed. First, the FNS equipment buyout eliminated the leases on the POS terminals and printers. Second, the original demonstration contractor's team of maintenance technicians was replaced by PDPW's regular contractor for computer terminal service. Finally, PDPW converted the telephone lines in the stores to Centrex service and added links between the Reading exchange and the HSH computer center in Harrisburg.

The buyout of the POS hardware was the key factor behind the drop in terminal and communications costs from \$37,815 (\$11.18 per case month) in the original demonstration to \$12,599 (\$3.39 per case month) in Phase B. The POS hardware leases made up 25 percent of all EBT system operating costs in the original demonstration; in Phase B, terminal amortization was less than 9

percent of the total.¹ Despite the added lines between Reading and Harrisburg, communications costs fell in Phase B, as did POS hardware installation and repair costs.

Terminal and communications costs rose slightly to \$15,612 (\$3.68 per case month) in Phase C. The chief factor in the increase was a jump of \$0.58 per case month in the cost of the line providing dial-up access for the BCAO workstation and forwarding of hotline calls to HSH, because of a change in PDPW's telephone rate structure. This increase was offset by the caseload expansion, which reduced the cost per case month for POS hardware amortization and maintenance.

SUMMARY OF TRENDS IN EBT SYSTEM OPERATING COSTS

As Exhibit 3-7 shows, PDPW's takeover and relocation of the EBT system considerably reduced operating costs, while the implementation of the redesigned system in Phase C increased costs somewhat. The Phase C cost is, nonetheless, only one-third of the original demonstration cost.

The Phase B hardware costs for all functions are artificially low because the equipment had been largely paid for during the original demonstration. Valuing this equipment at its estimated original cost instead of the buyout price, the total monthly payment for hardware amortization would be \$10,340 instead of \$3,822 -- an increase of \$1.75 per case month in Phase B costs.² This same approach, applied to the Phase C terminal and printer costs, would raise total Phase C operating costs by \$0.92 per case month, to \$10.06 per case month.

The cost difference between Phase B and Phase C lies in two categories of database/EBT center costs: hardware, and technical support labor. These costs rose because of the requirements of the redesigned system,

¹The monthly payment to amortize the original purchase cost of the terminals and printers is estimated at \$6,309, assuming a 5-year term and a 5-percent imputed interest rate.

²The Phase B total of \$3,822 per month for hardware amortization includes \$112 for the BCAO workstation (included under FSP costs), \$1,308 for the IBM Series/1 computers and peripherals (a data base/EBT center cost), and \$2,403 for the POS terminals and printers (included under terminal and communications costs).

which offset the potential unit cost savings in database costs from the caseload expansion. The redesigned system features numerous enhancements, however, and makes it possible to sustain in-house operations of the EBT system in the long run. The other major source of the cost increase in Phase C was the hike in communications costs, which was independent of the redesign of the system.

As indicated earlier, the HSH workstations, the VIPS, and the technical labor could probably be spread over a larger caseload, reducing unit costs. The caseload would have to expand considerably, however, to bring these costs down by the amount of the Phase B-Phase C difference. Greater gains could be made if the need for technical support were reduced.

3.3 COMPARISON OF PHASE C ATP/COUPON SYSTEM OPERATING COSTS WITH COSTS DURING PHASE B AND THE ORIGINAL DEMONSTRATION PERIOD

The data also permit analysis of trends in ATP/coupon system issuance costs over time. Comparing Phase C ATP/coupon system costs with those for Phase B and the original demonstration period shows the impacts of changes in the ATP/coupon system and of exogenous forces (e.g., wage increases) that act on both issuance systems.

Exhibit 3-8 summarizes the ATP/coupon system issuance costs by function for Phases B and C of the extended demonstration and for the original demonstration period (using data from the earlier EBT demonstration evaluation).¹ As the exhibit shows, ATP/coupon system issuance costs for Berks County were quite stable over the three-and-one-half year span represented, dropping from \$2.92 per case month in the original demonstration to \$2.35 per case month in Phase B and then rising slightly to \$2.74 per case month in Phase C. Changes in issuance costs were concentrated in two functional areas: authorizing access to benefits and delivering benefits.

¹William L. Hamilton et al., op. cit., pp. 35-63.

Exhibit 3-8

ATP/Coupon System Operating Costs by Task:
Comparison of Phase C with Original
Demonstration and Phase B

Function/Task	Original Demonstration Cost per Case Month	Phase B Cost per Case Month	Phase C Cost per Case Month
Authorize Access to Benefits:			
Issue/update/replace ID	0.09	0.09	0.10
Print and mail ATP/ ATP problems	<u>0.73</u>	<u>0.42</u>	<u>0.70</u>
Total	\$0.82	\$0.51	\$0.80
Deliver Benefits:			
Supply coupons	0.33	0.27	0.29
Transact ATP	<u>1.27</u>	<u>1.11</u>	<u>1.14</u>
Total	\$1.60	\$1.38	\$1.42
Credit Retailers:			
FRB processing	0.14	0.14	0.16
FNS monitoring, payment of fees	<u><0.01</u>	<u><0.01</u>	<u><0.01</u>
Total	\$0.14	\$0.14	\$0.16

(continued on next page)

Exhibit 3-8

ATP/Coupon System Operating Costs by Task:
Comparison of Phase C with Original
Demonstration and Phase B (continued)

Function/Task	Original Demonstration Cost per Case Month	Phase B Cost per Case Month	Phase C Cost per Case Month
Manage Retailer Participation:			
Authorize/train retailers	0.05 ¹	0.01	0.02
Monitor redemptions	0.02	0.03	0.03
Enforce compliance	0.07	0.07	0.08
Set policy, oversee redemption system	<u><0.01</u>	<u>0.01</u>	<u>0.01</u>
Total	\$0.14	\$0.12	\$0.13
Reconcile and Monitor Issuance System:			
Reconcile issuances	0.18	0.19	0.21
Report coupon, issuance losses	0.03 ²	0.01	0.01
Set policy, oversee issuance systems	<u><0.01</u>	<u>0.01</u>	<u>0.01</u>
Total	\$0.21	\$0.20	\$0.23
GRAND TOTAL	\$2.92	\$2.35	\$2.74

Notes: ¹Includes all field office functions for original demonstration period.

²Includes coupon management and issuance reviews.

Totals do not equal sum of subtotals because of rounding.

AUTHORIZING ACCESS TO BENEFITS

The cost of authorizing access to benefits in the ATP/coupon system fell from \$0.82 per case month in the original demonstration to \$0.51 per case month in Phase B, then rose to \$0.80 per case month in Phase C. The components of these costs are detailed in Exhibit 3-9.

The shifts in the cost of authorizing access to benefits involve two offsetting changes in the process of issuing new and replacement ATPs. Data processing costs for this task fell by \$0.17 per case month from the original demonstration to Phase B, because BIS switched from punched computer cards to laser-printed ATPs designed to be optically scanned. (Data processing costs for ATP production rose from Phase B to Phase C, due to increases in labor and data processing rates.) Meanwhile, BCAO resumed issuing expedited ATPs manually, a practice that had stopped prior to the original demonstration. The effort devoted to expedited ATPs and replacements drove BCAO labor costs for issuing and replacing ATPs up from \$0.17 per case month in the original demonstration period to \$0.29 per case month in Phase C (excluding indirect costs). The BCAO direct labor cost for issuing and replacing ATPs was \$0.08 per case month in Phase B.¹ Thus, the fluctuations in BCAO costs account for most of the variation in the costs of this task. An additional factor in Phase C was an increase in postal rates for presorted mail from 18 cents per ATP to 21 cents. (The difference in postage and presorting costs between the original demonstration and Phase B appears because presorting costs for the original demonstration are included in the "Other direct costs" category in Exhibit 3-9.)

DELIVERING BENEFITS

The drop in the cost of delivering benefits from \$1.60 per case month in the original demonstration to \$1.38 per case month in Phase B and \$1.42 per case month in Phase C reflects changes in both tasks that make up this function, as shown in Exhibit 3-8 and detailed in Exhibit 3-10. First, coupon supply costs fell from \$0.33 per case month to \$0.27 in Phase B and

¹The BCAO time study data for Phase B may understate the cost of issuing and replacing ATPs. Although workers manually issued expedited ATPs in Phase B, they reported very little time for this task.

Exhibit 3-9

ATP/Coupon System Costs to Authorize Access to Benefits:
Comparison of Phase C with Original Demonstration
and Phase B

Task/Item	Original Demonstration Cost per Case Month	Phase B Cost per Case Month	Phase C Cost per Case Month
1. Issue/Update/Replace ID			
BCAO labor	\$ 0.07	\$ 0.06	\$ 0.07
DMCS labor	<0.01	<0.01	<0.01
Blank IDs ¹	<0.01	<0.01	<0.01
Indirect costs ²	<u>0.02</u>	<u>0.03</u>	<u>0.03</u>
Task Total ³	\$ 0.09	\$ 0.09	\$ 0.10
2. Issuance and Mail ATP/ ATP Problems			
BCAO labor	\$ 0.17	\$ 0.08	\$ 0.29
BIS labor	0.01	0.01	0.01
DMCS labor	<0.01	<0.01	<0.01
Mailroom labor	<0.01	<0.01	<0.01
Blank ATPs and envelopes ⁴	0.02	0.02	0.02
Data processing	0.22	0.05	0.06
Postage and presorting ⁵	0.19	0.20	0.24
Other direct costs ⁶	0.02	0.01	<0.01
Indirect costs ²	<u>0.09</u>	<u>0.05</u>	<u>0.08</u>
Task Total ³	\$ 0.73	\$ 0.42	\$ 0.70
Total Cost to Authorize Access to Benefits	\$ 0.82	\$ 0.51	\$ 0.80

- Notes: ¹Includes shipping for Phases B and C.
²See Appendix IIIA for explanation of Phase B and C indirect cost factors.
³Items may not sum to totals because of rounding.
⁴Blank ATPs only for Original Demonstration.
⁵Postage only for Original Demonstration.
⁶Other direct costs for Original Demonstration include: presorting, stuffing equipment, and envelopes. Costs for Phases B and C include stuffing equipment, cutter used to separate ATPs, and space for blank ATP storage.

Sources: Original Demonstration data from Hamilton, *et al.*, *op. cit.*, p. III-24. Phase B and C data from BCAO time study and PDPW interviews.

Exhibit 3-10

ATP/Coupon System Cost to Deliver Benefits:
Comparison of Phase C with Original Demonstration and Phase B

Task/Item	Original Demonstration Cost per Case Month	Phase B Cost per Case Month	Phase C Cost per Case Month
1. Supply Coupons			
FNS labor	\$ 0.00	\$<0.01	\$<0.01
PDPW labor	0.01	0.02	0.02
Coupon printing	0.23	0.15	0.17
FNS coupon storage, distribution and shipping	0.03	0.03	0.02
PDPW armored carrier	0.06	0.07	0.07
Other PDPW direct costs	--	<0.01	<0.01
Indirect costs ¹	<u><0.01</u>	<u><0.01</u>	<u><0.01</u>
Task Total²	\$ 0.33	\$ 0.27	\$ 0.29
2. Transact ATP			
PDPW labor	\$ 0.01	\$<0.01	\$<0.01
Bank fees	1.19	1.11	1.13
Other direct costs	<0.01	<0.01	<0.01
Indirect costs ¹	<u>0.07</u>	<u>--</u>	<u>--</u>
Task Total²	\$ 1.27	\$ 1.11	\$ 1.14
Total Cost to Deliver Benefits	\$ 1.60	\$ 1.38	\$ 1.42

Notes: ¹See Appendix IIIA for explanation of indirect costs.

²Items may not sum to totals due to rounding.

Sources: Original Demonstration costs from Hamilton, et al., op. cit., p. III-26. Phase B and C costs from PDPW and FNS interviews.

[illegible]

The original demonstration cost for transacting ATPs includes \$0.07 per case month for indirect costs, which are not applicable to issuance fees for Phases B and C under the methodology used in this evaluation. The indirect cost data available for the original demonstration were not sufficiently detailed to determine whether issuance fees were included in the base used to compute indirect cost rates, so the rates were applied to all direct non-labor costs as well as labor costs. For this evaluation, the indirect cost rates are generally applied exclusively to labor costs, with the exception of BIS data processing and equipment costs. This is the preferred approach, since the indirect cost factors primarily reflect the supervision and other resources (space, office supplies, services, etc.) needed by state

staff.

Office. Increases in labor rates contributed to the increase in the cost of this function to \$0.13 in Phase C.

The cost of reconciling and monitoring the ATP/coupon issuance system fell from \$0.21 per case month in the original demonstration to \$0.20 in Phase B before rising to \$0.23 in Phase C. Costs for reporting issuance losses and issuance oversight fell from \$0.04 per case month in the original demonstration to \$0.02 per case month in Phase C, chiefly due to reductions in Mid-Atlantic Regional Office effort devoted to these tasks.

Changes in the technology of issuance reconciliation used by PDPW produced offsetting effects on the cost of reconciling issuances, which rose by \$0.01 per case month from the original demonstration to Phase B and by \$0.02 per case month in Phase C. The line-item costs by task for this function are presented in Exhibit 3-11. The replacement of the punch-card ATP with the laser-printed version reduced BIS data entry and processing costs from \$0.11 per case month in the original demonstration to \$0.06 in Phase B. The new ATP format required the contractor that microfilms the canceled ATPs to purchase new sorting equipment, leading to an increase of \$0.03 per case month in the cost of this activity.

In Phase C, the shift of the Philadelphia caseload from a direct-delivery ATP system to an on-line coupon issuance system reduced total BIS reconciliation costs. However, the reduction in cost was less than proportional to the number of cases, raising the BIS labor and data entry and processing costs for reconciliation of the regular ATP system to a total of \$0.12 per case month (compared with \$0.10 per case month in Phase B).

SUMMARY

Over the three-and-one-half years from the original demonstration to Phase C, the primary factors pushing up on ATP/coupon system costs were the return to manually issued expedited ATPs, salary increases, Federal Reserve charges for coupon processing, and postage rates. Offsetting these influences were new efficiencies in data processing, lower coupon printing and distribution costs, and reallocations of FNS effort to non-issuance functions.

Exhibit 3-11

ATP/Coupon System Costs to Reconcile and Monitor
Issuance System: Comparison of Phase C with Original Demonstration
and Phase B

Task/Item	Original Demonstration Cost per Case Month	Phase B Cost per Case Month	Phase C Cost per Case Month
1. Reconcile Issuances			
BIS labor	\$ 0.03	\$ 0.04	\$ 0.05
Other PDPW labor ¹	0.02	0.02	0.02
Data entry and processing	0.11	0.06	0.07
Microfilming	0.02	0.05	0.05
Other PDPW direct costs	<0.01	<0.01	<0.01
Indirect costs ²	<u>0.01</u>	<u>0.02</u>	<u>0.02</u>
Task Total ³	\$ 0.18	\$ 0.19	\$ 0.21
2. Report Issuance Losses			
PDPW labor ¹	--	\$<0.01	\$<0.01
FNS labor ⁴	<0.01	<0.01	0.01
Data entry and processing	0.01	0.01	0.01
Indirect costs ²	<u><0.01</u>	<u><0.01</u>	<u><0.01</u>
Task Total ³	\$ 0.01	\$ 0.01	\$ 0.01
3. Oversee Issuance System			
FNS National Office labor	\$<0.01	\$<0.01	\$<0.01
MARO labor ⁴	0.02	<0.01	<0.01
Travel ⁵	--	<0.01	<0.01
Indirect costs ^{2,5}	<u><0.01</u>	<u><0.01</u>	<u><0.01</u>
Task Total ³	\$ 0.02	\$ 0.01	\$ 0.01
Total Cost to Reconcile and Monitor Issuance System	\$ 0.21	\$ 0.20	\$ 0.23

(see next page for notes)

Exhibit 3-11

ATP/Coupon System Costs to Reconcile and Monitor
Issuance System: Comparison of Phase C with Original Demonstration
and Phase B
(continued)

- Notes: ¹ In Original Demonstration data, "other" PDPW labor to reconcile issuances (Task 1) includes reporting issuances losses (Task 2).
² See Appendix IIIA for explanation of indirect costs.
³ Items may not sum to totals due to rounding.
⁴ In Original Demonstration data, MARO labor to process coupon orders and loss reports is included in Task 3.
⁵ In Original Demonstration data, indirect cost for Task 3 includes MARO travel.

Sources: Original Demonstration data from Hamilton, et al., op. cit., p. III-32 to III-33. Phase B and C data from PDPW and FNS interviews.

3.4 DESIGN, DEVELOPMENT AND IMPLEMENTATION COSTS OF THE PHASE C EBT SYSTEM

In comparing the administrative cost of issuing benefits between the EBT system and the ATP/coupon system, the one-time costs of implementing an EBT system should be considered. These costs include designing the system's functional and technical characteristics, writing and testing the necessary software (or adapting generic point-of-sale and electronic funds transfer software), training staff and system participants, installing POS terminals and other hardware, and starting up operations. The original and extended EBT demonstrations provide the basis for anticipating what these costs would be for a similar project elsewhere.

The implementation of the Phase C EBT system differed from the process that other States would probably follow in a crucial respect: PDPW built upon an already operating system and its own in-house resources. When PDPW assumed responsibility for operating the EBT system, it already had the necessary computers and staff in place. FNS bought out the leases on the original EBT system's POS terminals and other equipment, and loaned the equipment to PDPW. Current EBT recipients had benefit cards, and participating stores had the needed telephone lines. The amortization of equipment and telephone usage charges are operational expenses, but the installation of equipment and telephone lines is an implementation task, as are staff training and initial card issuance. Selection of staff and hardware is normally necessary as part of design phase activities, and development may require the installation of computers.

Therefore, PDPW's costs to design, develop and implement the Phase C EBT system centered around the system's software and the central processors to be used. Through its mainframe computer vendor, Unisys, PDPW arranged for MTech Corporation to adapt its POS software to the requirements of the FSP and the current programming of the POS terminals. Unisys created the software for the batch processes to run on its computers, including ACH file creation, daily reconciliation, and system activity reports. The workstations and card encoder were replaced with units compatible with the MTech software. Computer operators, hotline staff, and BCAO clerks needed only minimal training to adapt to the changes in operating procedures. PDPW did, however, devote substantial effort to software testing and to monitoring and trouble-shooting operations during the early months of Phase C.

Exhibit 3-12 summarizes the effort and expenditures required to design, develop and implement the Phase C EBT system. PDPW and its vendors spent 7.44 person-years on the effort. The cost of PDPW's effort is estimated at \$138,347. (This cost includes assistance from PRC in converting the existing database.) Unisys and MTech did not charge PDPW for the 3.98 person-years they spent on system design, development, testing and implementation, in order to retain their rights over the software.¹

As Exhibit 3-12 shows, FNS and its technical assistance contractor also incurred costs, totaling \$108,292, to oversee the redesign of the EBT system. The 1.36 person-years spent by FNS and the contractor consisted primarily of monitoring PDPW and its contractors, but the FNS contractor spent 0.33 person-years providing direct technical assistance to PDPW.

DESIGN AND DEVELOPMENT COSTS

The 6.3 person-years spent by PDPW and its contractors to design and develop the PDPW EBT system are indicative of the level of effort for these tasks faced by other States considering the adoption of EBT technology. In contrast, PRC spent 16.3 person-years designing and developing the original EBT system, at a cost of \$1,332,722 (including labor, fringe, overhead and other non-labor costs). Like PDPW, other States would presumably base their EBT systems on off-the-shelf software. Few States are likely to incur the expense of purchasing entirely new computer systems for an EBT system; most would use their existing hardware or contract with a vendor to perform the processing.

Other States would face some tasks that were performed by PRC or PDPW prior to Phase B. PRC procured the POS terminals, designed the logic for their programming, directed the programming by the manufacturer, and tested the devices before deploying them. PDPW assembled a project team for the transition from PRC operation to in-house operation of the original EBT system. This team acquired substantial "POS literacy" and performed some preliminary design tasks for the PDPW system during the transition process.

¹At the rate per person-year charged by PRC to design and develop the original EBT system, this effort would be worth approximately \$263,000, including labor, fringe and overhead. (Source: William L. Hamilton et al., op. cit., p. 29.)

Exhibit 3-12

PDPW EBT System Development and Implementation Labor:
Summary of Effort by Organization and Stage

Organization	Design Effort (person- years)	Development Effort (person- years)	Implementation Effort (person- years)	Total Effort (person- years)	Total Cost
PDPW/PRC	0.79	1.61	1.06	3.46	\$138,347
MTech (a)	0.54	1.90	0.08	2.51	(a)
Unisys (a)	<u>0.40</u>	<u>1.07</u>	<u>0.00</u>	<u>1.47</u>	<u>(a)</u>
PDPW/Vendor Total	1.72	4.58	1.13	7.44	\$138,347
FNS Monitoring and Technical Assistance (b)	<u>0.29</u>	<u>0.97</u>	<u>0.11</u>	<u>1.36</u>	<u>\$108,292</u>
Total, All Organizations	2.01	5.55	1.24	8.80	\$246,639

Notes: ^aMTech and Unisys did not charge PDPW for their services. See text for further discussion.

^bFNS effort and cost include Abt Associates' provision of technical assistance to FNS and PDPW.

Sources: Interviews with PDPW, vendor and FNS staff.

These tasks might add 5 to 10 percent to design and development costs in other States.

IMPLEMENTATION COSTS

The costs of implementing the original EBT system in Reading, rather than the Phase C system, provide the best available indication of the resources required to perform the same tasks elsewhere. PRC spent 5.9 person-years on EBT system implementation, at a cost of \$590,888. These figures include installing the EBT Center and store equipment, training program staff and retailers, and monitoring and trouble-shooting until system operations stabilized. (They do not include ongoing operational costs, such as operator labor, equipment leases, and telephone usage.) Implementation costs should be somewhat lower with a system using off-the-shelf software, inasmuch as the vendor should have already worked out the "bugs" in previous installations. For example, PRC's costs would have been \$488,453 if operations had stabilized by the end of March 1985, two months after the last wave of training.¹

The costs incurred by PDPW's Office of Income Maintenance (OIM) and BCAO during the implementation of the original demonstration provide a basis for predicting the costs of issuing cards, training recipients, and handling recipient problems during implementation. OIM and BCAO staff spent 2.6 person-years on issuing photo IDs, encoding benefit cards, training 3,600 recipients, and other tasks during EBT system implementation, at a cost of \$98,799.² FNS effort during the implementation phase was 1.7 person-years, at a cost of \$70,182.

TOTAL PRE-OPERATIONAL COSTS

Based on the original demonstration's implementation costs and the design and development costs for Phase C, the full costs incurred by a State to establish a system like the Phase C EBT system (with a caseload of about

¹Based on data in William L. Hamilton et al., op. cit., Exhibit III-B4, p. III-13.

²In preparation for EBT system implementation, photo IDs were issued to ongoing recipients during the development phase. This activity is counted here as part of the implementation cost.

3,600 households) would be approximately \$800,000, including approximately \$200,000 for design and development (based on PDPW's experience) and \$600,000 for implementation (based on PRC's cost, assuming savings approximately equal to PDPW's cost for original system implementation). This estimate assumes that vendors would not charge for most of their design and development efforts. (Costs for the computers and POS equipment are not included, since these should be considered operational costs.) Development and implementation costs would be higher for a State Agency that, unlike PDPW, had to install on-line processors and train staff to operate them.

The development and implementation costs would be lower if transaction processing and settlement were contracted out to a POS system operator (or similar vendor) who would be familiar with both the base software used for the EBT system and the operating environment, and thus would be better prepared to deal with issues such as interfaces between processors and other hardware/software integration questions. A POS or ATM system operator would also have lower staff training costs.¹

FNS costs to oversee EBT system design, development and implementation under the scenario assumed above would be around \$180,000 (combining the design and development oversight costs of \$102,357 for the PDPW system with the implementation phase costs of \$70,182 for the original demonstration, with allowance for inflation). This estimate may be high, because FNS monitored the first month of original demonstration operations very closely, deploying a number of staff on-site as facilitators at a cost of nearly \$27,000.

3.5 GENERALIZABILITY OF ATP/COUPON SYSTEM AND EBT SYSTEM ADMINISTRATIVE COST ESTIMATES

The estimates of Phase C administrative costs of issuance in the ATP/coupon system and the EBT system are, strictly speaking, only representative of these systems as they operate in Berks County, Pennsylvania. Some of the most significant components of the ATP/coupon system estimate, however, represent average costs for the entire regular ATP caseload in Pennsylvania (e.g., issuance agent fees) or, in the case of coupon production, for the

¹Development and implementation costs for several EBT system scenarios are presented in John A. Kirlin et al., op. cit.

nation. On the other hand, the EBT system costs are almost entirely site-specific, except for the costs for generating and reconciling issuance files.

Therefore, it is useful to place the results in the perspective of available data on issuance costs elsewhere. For the ATP/coupon system, it is possible to compare Pennsylvania's food stamp issuance costs as reported on the FNS-269 form with those of other States that primarily issue benefits in this manner.

The FNS-269 issuance cost data should be viewed with care for several reasons. They do not necessarily represent all issuance-related costs. In general, the definition of issuance for reporting purposes excludes ATP printing and local welfare office costs (except for units directly responsible for issuing coupons). Moreover, the specific items charged to this category may vary from State to State. Nonetheless, the FNS-269 reports provide the best available data on issuance costs outside Pennsylvania.

Exhibit 3-13 compares Pennsylvania's average monthly issuance cost from the FNS-269 for Fiscal Year 1987 with data for the 15 other States that issue 75 percent or more of their food stamp benefits via ATPs. (The FNS-46 data used to identify ATP States include direct-delivery and on-line issuance systems, both of which are presumably more costly than the regular ATP system because of additional effort by issuance offices.) The ranking of the States by issuance cost per household shows that Pennsylvania's reported cost of \$1.73 per household is below the weighted average of \$1.82 per household but still fairly typical of this group of States. For comparison purposes, the evaluation estimates of PDPW's ATP/coupon system cost are \$1.90 for Phase B and \$2.24 for Phase C (including data processing, BCAO costs, and other items not included in the FNS-269 issuance cost category.)¹

The data in Exhibit 3-13 imply that the evaluation results for ATP/coupon system costs are fairly representative of true issuance costs elsewhere. While a few States do have greater issuance costs than Pennsylvania, none has costs as great as the \$9.14 per case month cost of the Phase C EBT system. Thus, an EBT system would have to be substantially less expensive

¹The reported costs for Pennsylvania reflect the additional fee of \$0.27 per ATP paid for direct delivery, which was used for about half of the State's caseload in FY1987.

Exhibit 3-13

Issuance Cost Data for ATP/Coupon System States¹
(Ranked by Issuance Cost per Case Month)

State	Average Monthly Households Participating FY 1987	Total FY 1987 Issuance	Total FY 1987 Federal Issuance Costs ²	Percent of FY 1987 Total Benefits Issued by ATP	Total Issuance Cost per Case Month ³
District of Columbia	25,446	\$32,458,578	\$694,484	99%	\$4.55
South Dakota	17,433	29,732,772	358,776	100	3.43
New York	702,963	896,324,301	11,068,100	100	2.62
South Carolina	100,765	159,255,867	1,500,838	94	2.48
Indiana	113,977	200,154,724	1,361,282	100	1.99
Louisiana	231,864	417,058,114	2,586,126	83	1.86
Pennsylvania	397,217	524,243,264	4,114,884	100	1.73
Delaware	10,893	16,513,715	111,588	100	1.71
Texas	463,708	877,435,470	4,398,014	75	1.58
Rhode Island	26,032	30,973,022	223,378	100	1.43
Washington	122,115	156,703,250	1,046,241	77	1.43
Hawaii	32,885	85,319,250	279,264	100	1.42
Massachusetts	129,877	139,371,771	1,071,423	100	1.37
California	563,927	615,744,733	4,433,504	79	1.31
New Jersey	144,584	220,258,001	886,625	99	1.02
Connecticut	42,735	48,248,534	48,055	100	0.19
Total	3,126,422	\$4,449,795,366	\$34,182,585	--	\$1.88
Weighted Average Issuance Cost per Household					\$1.82
Evaluation Estimate of PDPW Phase C ATP/Coupon System Cost⁴					\$2.24

Notes: ¹The States included in this table issued 75 percent or more of FY 1987 benefits via mail ATPs, direct delivery ATPs, or on-line issuance systems.

²Issuance costs are as reported on the SF-269 report, excluding data processing and certification worker costs related to benefit issuance.

³Total issuance cost per case month includes State and Federal shares of FY 1987 issuance costs. States pay 50 percent of these costs.

⁴Evaluation estimate is the total of all State and local issuance costs, including direct and indirect costs.

Source: USDA/FNS/Automated Data Management and Analysis Section, State Tables of Activity Ranking (Plus), FY 1987.

than the Phase C Reading system to be cost-competitive with an ATP/coupon system.

As mentioned in Chapter 1, FNS has funded additional EBT demonstrations initiated by the States of Minnesota, New Mexico and Washington. (Maryland has also undertaken an EBT demonstration under FNS guidelines for unsolicited demonstrations.) The selection criteria for these demonstrations included a requirement that projected EBT system operating costs be equal to or less than current coupon issuance costs, including FNS coupon supply costs and issuance losses. The States have a financial incentive to stay within projected costs, since they will not receive FNS reimbursement for EBT system operating costs in excess of current coupon issuance costs.

The State-initiated EBT demonstrations will provide further evidence as to whether EBT system operating costs can be reduced to the level of the coupon system. Unlike the PDPW EBT system, the next generation of systems will issue Aid to Families with Dependent Children and other cash benefits as well as food stamp benefits. All of the new demonstration sites have contracted with commercial transaction processors to develop and operate their EBT systems, a move that should reap the cost advantages of large-scale operations even for a pilot area.

In addition, the new demonstration sites hope to reduce terminal costs by making the system available to process bank debit card transactions and other commercial POS activity. In some cases, the vendor will deploy the terminals and offset costs through fees; in others, retailers will be asked to lease terminals if they wish to use them for non-food stamp transactions. This integration of an EBT system with a commercial debit-card system (sometimes known as "piggy-backing") offers perhaps the greatest potential for cost savings, given the high fixed cost of deploying and maintaining the terminals required to include all FSP-authorized retailers.

3.6 CONCLUSIONS

The administrative costs of the ATP/coupon system and the EBT system in Reading during the extended demonstration period are summarized in Exhibit 3-14, together with the costs of these systems during the original demonstration period. As the exhibit shows, EBT costs fell by nearly \$20 per case month with the takeover and relocation of the original EBT system by PDPW.

Exhibit 3-14

**Summary of Administrative Costs:
Original EBT Demonstration vs. Phase B and Phase C
of Extended EBT Demonstration**

Period	ATP System Cost per Case Month	EBT System Cost per Case Month
Original Demonstration	\$2.92	\$27.22
Phase B, Extended Demonstration	2.35	7.55
Phase C, Extended Demonstration	2.74	9.14

Sources: Original demonstration costs from Hamilton et al., op. cit., p.66.
Extended demonstration costs from PDPW and FNS interviews, BCAO and
HSH time studies, and PDPW cost reports.

The principal sources of cost savings in Phase B were the FNS buyout of the system hardware and the elimination of operator idle time through integration of EBT operations with the rest of PDPW's data processing.

EBT system operating costs in Phase C of the extended demonstration were \$9.14 per case month, an increase of \$1.71 per case month over Phase B. The redesign of the EBT system reduced labor costs for day-to-day operations (including computer operations and the hotline). However, equipment costs rose as the largely paid-for computers and workstations from the original system were replaced by new, leased equipment with greater capacity. Technical support costs also rose, reflecting the relative newness of the system. An unrelated telephone rate increase also contributed to the higher Phase C costs.

ATP/coupon system costs in Phases B and C were lower than in the original demonstration, as Exhibit 3-14 shows. At \$2.74 per case month, the Phase C ATP/coupon system cost represents savings of 6 percent over the original demonstration. PDPW reduced its costs by changing the technology of ATP printing. FNS reduced coupon supply costs and Field Office effort devoted to retailer management. Partially offsetting these savings were PDPW's reintroduction of manually issued ATPs for expedited cases and salary increases.

There are several ways in which PDPW might be able to reduce the gap in administrative costs between the EBT system and the ATP/coupon system. Some of the cost components that rose with the implementation of the redesigned system are essentially fixed costs (such as BIS technical support, DPSP oversight, and the VIPS), and would probably remain the same if the caseload were expanded, either geographically or through the addition of other assistance programs. Such expansion would, of course, entail additional operating costs for recipient training, terminal deployment and data processing. However, these additional costs are probably proportional to scale, so the net effect would still be a reduction in the cost per case month. (Training and card issuance costs would be shared under a multi-program EBT system, as discussed in Section 3.1.) Management and technical support costs should decline over time, as operations continue to become more routine and the level of scrutiny diminishes. Finally, terminal costs could be reduced by joining forces with a commercial debit card network. PDPW is

currently working on plans to expand and enhance the EBT system and has considered many of these options.

The next round of FNS-sponsored EBT demonstrations, already in the design stage, will provide additional information on the possibilities for operating an EBT system at a cost comparable to that of the ATP/coupon system or the mail-issued coupon system. All of these demonstrations will involve multi-program EBT systems that are integrated with commercial electronic financial systems. The evaluation of these demonstrations, together with the future of the PDPW EBT demonstration, will answer the questions that remain on the administrative cost-effectiveness of this approach to issuing and redeeming food stamp benefits.

Chapter Four

SYSTEM VULNERABILITY TO BENEFIT LOSS AND DIVERSION

An EBT system offers the potential to reduce certain types of losses by providing an alternative benefit delivery mechanism to the Authorization-to-Participate (ATP) card and paper coupons. As a result, one of the purposes of the original demonstration of the EBT system in Reading was to determine whether an EBT system could substantially reduce benefit loss and diversion in the Food Stamp Program.

The evaluation of the original demonstration found evidence that the EBT system would reduce vulnerability to loss and diversion of benefits in the Food Stamp Program. While the dollar value of losses was small in either system, the evaluation estimated a reduction of more than two-thirds in total losses in the EBT system compared with the ATP/coupon system.¹ The EBT system's largest impact on vulnerability was its reduction in diversion of benefits from their intended use, primarily by eliminating cash change. Because the demonstration was fairly small and operated for a relatively short time period, actual losses to the demonstration would not be representative; the estimate of losses in the EBT system was therefore constructed to reflect losses in an ongoing, non-demonstration environment.

The extended demonstration provides the opportunity to further evaluate the impact of an EBT system on benefit loss and diversion. The redesign of the system software and replacement of much of the system's hardware presents the potential for changes in the vulnerability of the system. In addition, the extended demonstration provides more experience with an EBT system (and its vulnerabilities to benefit loss and diversion) over a longer time period.

The estimates of EBT-related loss and diversion presented in this chapter must be interpreted carefully. The estimates do not measure actual losses during the original or extended demonstrations; rather, they are intended to reflect the level of losses that would be expected in mature, ongoing systems of the same design as the demonstration systems. Further, these estimates are based on a combination of reported data and expert

¹William L. Hamilton et al., op. cit., p. 108.

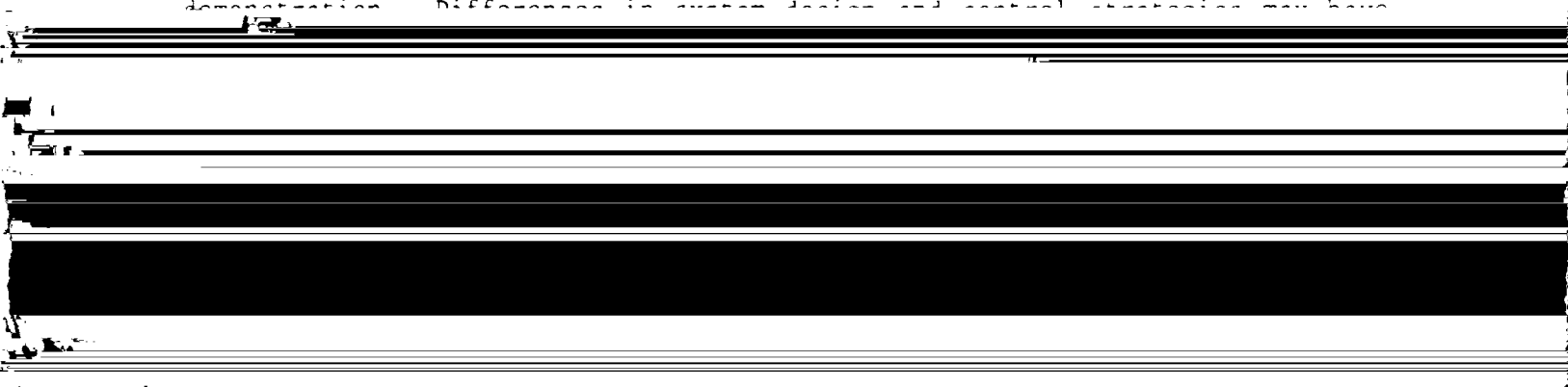
judgments about potential vulnerabilities and about the probability of exploitation of those vulnerabilities. These estimates do, however, provide a more complete picture of vulnerabilities and losses than found in reported data, which measure only certain kinds of discovered losses.

KEY HYPOTHESES

The evaluation of the extended demonstration addresses three main research objectives regarding system vulnerability to benefit loss and diversion:

- identify the major vulnerabilities and associated control strategies of the redesigned (Phase C) EBT system;
- estimate the potential loss and diversion of benefits in the redesigned EBT system, and compare the estimate with the estimated losses for the original demonstration system; and
- compare the estimates of benefit loss and diversion in the EBT system to estimated losses and diversions in the ATP/coupon system.

The evaluation of system vulnerabilities primarily focuses on a comparison of the redesigned EBT system with the EBT system in the original demonstration. Differences in system design and control strategies may have



changed the vulnerability of the EBT system to benefit loss and diversion. With the redesigned EBT system, vulnerability may have decreased, for example, because of greater use of off-the-shelf software. On the other hand, new system hardware or changes in system control strategies could have increased the potential for loss. As a result, the impact of the redesigned system on benefit loss and diversion cannot be predicted a priori.

While a main focus of the analysis is on the comparison of the two

while the overall impact of the EBT systems is likely to be a reduction in vulnerabilities compared with the ATP/coupon system, the effect on specific types of loss or diversion could be in either direction.

RESEARCH STRATEGY

The main types of vulnerability to benefit loss and diversion are divided into six categories:

- excessive authorizations -- food stamp benefits are issued to persons who are not certified to be eligible, or to eligible persons in excess of their authorized amounts.
- excessive redemption credits -- cash credit is given to food retailers or banks exceeding the value of coupons they redeem.
- loss or theft during production and handling -- benefits are redeemed without being authorized.
- benefits lost by or stolen from recipients -- a person other than the recipient redeems the benefits.
- benefits used in an unintended manner -- benefits are used by recipients for purposes other than for buying eligible food items.
- lost retailer credits -- recipients buy food with food stamp benefits, but the retailer does not receive credit.

The first three categories of vulnerability listed above are considered losses to the Food Stamp Program and lead to increased program costs. Some of these losses may be recovered, however, in which case program costs would not increase by the full amount of the loss. For example, coupon issuance agents are liable for certain losses, such as the transaction of expired ATPs; these losses are subtracted from the fees paid to issuance agents. Where data are available, we identify recovered losses, and present estimates of net losses (losses minus recoveries) as well as gross losses.

The last three categories of vulnerabilities shown above -- benefits lost by or stolen from recipients, recipient use of benefits in an unintended

manner, and lost retailer credits -- generally do not add to program costs. These vulnerabilities, however, divert benefits away from the achievement of Food Stamp Program objectives. It is important to note that not all benefit diversion involves illegal behavior. For example, up to 99 cents in cash change can be given to a recipient using coupons to purchase eligible food items. Using some of this change to buy ineligible items does not violate Food Stamp Program rules, but it diverts benefits from their intended use.¹

A vulnerability assessment was the first step in analyzing the impacts of the EBT system on benefit loss and diversion. The assessment identified the principal vulnerabilities of the EBT and coupon systems within each of the six categories described above. In addition, the control strategies designed to limit these vulnerabilities were identified for each of the systems. For the redesigned system, the vulnerability assessment focused primarily on differences in vulnerabilities and control strategies between the two EBT systems.

The next step of the analysis was to collect reported data on losses. The reported data used in this analysis for the ATP/coupon system are mostly taken from recent reconciliation reports for Pennsylvania. Data on measured losses in the EBT system during the original and extended demonstrations are presented where available.

Reported data on losses are incomplete because they only include discovered losses. Some losses are never detected and therefore cannot be accounted for. In addition, measures of actual losses in the EBT and ATP/coupon systems may not be strictly comparable. Losses in a demonstration -- which is highly visible and lasts a relatively short time -- may not reflect the level of losses that would occur in a mature, ongoing system.

As a supplement to the reported loss data, interviews were conducted with six individuals knowledgeable about electronic funds security or EBT technology. The experts provided a range of estimates of expected losses arising from each vulnerability. The loss estimates presented in this chapter

¹Food Stamp Program rules do not allow recipients to make repeated small purchases in order to generate change.

approximate a "consensus" of the respondents' estimates, taking into account the reasons given by the respondents in support of their estimates.

The structure of the interviews paralleled the approach used in the evaluation of the original demonstration. For each vulnerability, we presented estimates of losses in the ATP/coupon system to provide a comparison for the level of losses estimated for the original and extended EBT demonstrations. The expert respondents were first asked to re-evaluate the loss estimates for the original EBT system, based on new information on vulnerabilities and system controls in that system. This new information on the original EBT system was obtained during a security review of the redesigned EBT system. The expert respondents were then asked to estimate losses in the redesigned EBT system, focusing on the impact of differences in system design and controls between the two EBT systems.

The loss and diversion estimates for the three systems (ATP/coupon, original EBT and redesigned EBT) are presented as a percent of benefits issued, and in terms of dollars per household per month. The percent estimates are converted into dollar figures using the national allotment amount for Fiscal Year (FY) 1988 to permit comparison with other data on losses. For FY 1988, the average allotment per household was \$131.69 in the United States.¹

HIGHLIGHTS

The expected losses in the redesigned EBT system are estimated to be about the same as the losses estimated for the original EBT system. The two systems have similar vulnerabilities and, for the most part, employ similar control strategies to limit those vulnerabilities. Total gross vulnerabilities are estimated to be about 1.07 percent of benefits in the redesigned EBT system and 1.04 percent of benefits in the original system. The difference in total losses between the two EBT systems is estimated to be only about 4 cents per case month.

¹The allotment figure is based on data from the FNS National Databank. The information was provided by the Program Accountability Division of FNS.

In the redesigned EBT system, loss and theft of EBT benefits from recipients is estimated to have increased slightly because of changes in card encoding procedures. Other losses in the redesigned system are estimated to be slightly lower than in the original EBT system because of better controls on double posting of issuance files and a more secure operating environment.

The estimated total vulnerabilities of the two EBT systems are about two-thirds lower than the estimated total vulnerabilities in the ATP/coupon system. Total gross losses and diversions are estimated to be over 3 percent of benefits in the ATP/coupon system, compared with about 1 percent of benefits in the two EBT systems. Most of the reduction in vulnerabilities in the EBT systems is due to the elimination of cash change and a reduction in benefits lost by or stolen from recipients.

ORGANIZATION OF THIS CHAPTER

Each of the next six sections of this chapter (Sections 4.1 through 4.6) presents one of the six major vulnerability categories identified above. For each category, the vulnerabilities and expected losses are discussed for the ATP/coupon system, original EBT system, and redesigned EBT system, in turn. The final section (4.7) summarizes the impact of the EBT system on benefit loss and diversion during the extended demonstration.

4.1 EXCESSIVE AUTHORIZATIONS

Each month the Pennsylvania Department of Public Welfare (PDPW) authorizes a specific amount of food stamp benefits for each participating household. PDPW places this information in the integrated Client Information System. In the ATP/coupon system, this information is then used to print ATPs. For the EBT demonstration, the records of those households in the demonstration are removed before ATPs are printed. The benefits of demonstration households are then electronically posted to their accounts on the EBT system's Client Authorization File.

During the original EBT demonstration, EBT issuance files were created at PDPW's data processing center in Harrisburg and transferred to Reading. For regular monthly issuances, a computer tape was physically transferred between the two sites. Other issuances were transmitted over telephone lines.

The redesigned system in Phase C of the extended demonstration uses nearly the same procedures as the original EBT system for generating and transmitting benefit issuance files. The main difference is that the issuance files are no longer transferred to Reading; the transfer occurs within the PDPW computer center in Harrisburg.

EXCESSIVE AUTHORIZATIONS IN THE ATP/COUPON SYSTEM

In the ATP/coupon system, excessive authorizations occur when the value of coupons issued in exchange for ATPs exceeds the benefits authorized in the State's issuance file.¹ Losses to the Food Stamp Program can occur when a stolen or lost ATP is reissued and both ATPs are exchanged for coupons. In addition, a recipient may falsely report an ATP as lost or stolen, obtain a replacement ATP, and cash both. To deter these types of losses, a food stamp identification card must be shown when exchanging an ATP for coupons. The signature of the recipient is also required when exchanging the ATP for coupons, so that comparison of signatures can be used to detect fraud.

Losses can also occur because of duplicate issuance of ATPs (caused by error or by fraud). Other fraudulent activity that can lead to losses includes transaction of ATPs that are altered or counterfeited, or blank ATPs that are stolen and transacted. In addition, transaction of ATPs that have expired or are from another state is not allowed by the Food Stamp Program, and these transactions are counted as losses.

Estimated losses. States are required by FNS to compare redeemed ATPs with their issuance files and report the number and value of unmatched ATPs monthly. These data provide an estimate of the amount of excessive authorizations in the ATP/coupon system. These figures may actually underrepresent the total amount of excessive authorizations, however, because of weaknesses in state reconciliation procedures.

Data on unmatched ATPs for the state of Pennsylvania indicate that, for FY 1988, unmatched ATPs represented 0.11 percent of benefits issued. This figure includes all of Pennsylvania except Philadelphia and Allegheny

¹Excessive authorizations in this analysis are those that occur in the issuance process. Losses due to error or fraud in the certification process are not included.

counties, which use different benefit delivery mechanisms. In terms of dollars, excessive authorizations are estimated to average \$0.14 per household per month.

Not all of the losses due to unmatched ATPs result in direct increases in Food Stamp Program costs. Issuance agents are liable for transactions of out-of-state and expired ATPs, and their fees are reduced by the amount of these unallowed transactions. For FY 1988, expired and out-of-state ATPs accounted for 0.09 percent of all ATPs transacted in Pennsylvania (excluding Philadelphia and Allegheny Counties), or 0.04 percent of benefits issued. If this full amount is recovered from issuance agents, estimated net losses¹ for the ATP/coupon system would then be about 0.07 percent of benefits issued, or \$0.09 per household per month.

EXCESSIVE AUTHORIZATIONS IN THE ORIGINAL EBT SYSTEM

In the EBT system, excessive authorization occurs if a recipient's account is credited in excess of the amount of benefits authorized for that case. Excessive authorizations could be caused by human error, such as posting an issuance file twice, or because of a computer problem, such as a software error.

Excessive authorizations could also occur as a result of fraudulent activity, such as the intentional overcrediting of a recipient's account or the creation of a fictitious account. The potential for serious loss exists because of the possibility that someone could establish a fraudulent account, obtain a card, and use the benefits wrongly issued to that account. The expert respondents thought that the most likely scenario of this type would involve someone with access to the system, such as a PDPW employee. Most of the expert respondents believed, however, that fraudulent activity of this nature was less likely than excessive authorizations caused by errors.

A number of control strategies in the original EBT system were designed to deter or identify excessive electronic benefit issuances. The first control was that benefit authorization for new accounts was separated

¹Costs associated with the recovery of losses are beyond the scope of this evaluation, so they are not included in the net loss estimates.

from the card encoding procedures. In addition, a number of system reconciliation procedures were intended to deter (and detect) unauthorized benefit issuances and errors. These reconciliation procedures included: a check on benefits transmitted (by PDPW) versus benefits received (by the EBT Center); monthly reconciliation of authorization and issuance files; and a daily system balance check. In addition, a manual check of issuance file dates was used to identify double postings of issuance files. Finally, physical and personnel security procedures were intended to limit access to the system and files.

Reported cases of excessive authorizations due to human or computer error were fairly rare during the original demonstration. The evaluation's report on the impacts of the demonstration identified only three discovered cases of excessive authorization.¹ Two of these cases were caused by software errors and affected only a small number of accounts. The third instance was a double posting of an issuance file, when recipients spent some of the overissued benefits before the error was discovered. No cases of issuances to fraudulent accounts were identified during the original demonstration.

Excessive authorizations can also occur if a recipient overdraws his or her account in a manually authorized transaction. When the EBT system is down, the recipient's balance is checked (prior to authorization of a manual sale) on a balance printout from the previous day. An overdraft can occur if the recipient has made an EBT purchase since midnight and the amount of the manual purchase exceeds the remaining balance in the account. If an overdraft occurs, the excess can be recovered from future issuances, if the client receives any. In any case, the potential loss from overdrafts is not very great because manual sales are limited to \$35, and manual sales including those attributed to terminal failure represented only 0.4 percent of all EBT purchases during the original demonstration.

Estimated Losses. The expert respondents generally agreed that the major vulnerability to excessive authorizations resulted from the potential for human and computer error, rather than from fraudulent activity. They also generally agreed that the system's controls would identify most of these errors. They did estimate that some losses would occur, however, in part

¹William L. Hamilton et al., op cit., p. 89.

because of weaknesses in the control strategies. The system reconciliation procedures and manual check of issuance dates would identify errors, they argued, but would not prevent occurrences of accidental losses. While some of these losses can be recovered, one respondent hypothesized that errors are likely to increase over time as system controllers become more lax about checking reconciliation reports. One respondent also felt that system reconciliation checks and recoupment procedures would deter most fraudulent activity leading to excessive authorizations.

Most of the expert respondents believed that losses due to excessive authorizations would be less in the original EBT system than in the ATP/coupon system. The EBT system completely eliminates the losses associated with loss and theft of ATPs, and so is likely to reduce losses due to excessive authorizations.

Based on the estimates provided by the expert respondents, we estimate the expected losses in the original EBT system to be 0.05 percent of benefits, or about half the level in the ATP/coupon system. This estimate translates into \$0.07 per household per month, based on the FY 1988 issuance amount per household for the United States.

Some of the losses due to excessive authorizations can be recovered by the Food Stamp Program. For example, recoupment procedures would allow recovery of much of the loss due to overdrafts in manual transactions. Benefits overissued to recipients because of a double posting could also be recouped. Recoupment procedures would probably not recover all of the losses, however, because some recipients will not receive enough future issuances to cover their overdrafts. Net losses due to excessive authorizations are therefore estimated to be about 0.03 percent of benefits issued, assuming that about half of the losses are recovered.¹ This estimate of net losses is less than half of that experienced in the ATP/coupon system.

¹In July 1986 (Phase B) an overissuance of \$1,474 to 21 recipient accounts occurred. Not quite a year later, 51 percent had been recovered. The remaining overissuances were referred to the investigation branch of PDPW. Some of the remaining funds may have eventually been recovered, because the recoupment procedures sometimes take a year or more.

EXCESSIVE AUTHORIZATIONS IN THE REDESIGNED EBT SYSTEM

The potential for losses due to excessive authorizations is very similar in the redesigned and original EBT systems. Several changes did occur in system vulnerability and control strategies in the redesigned EBT system, however. First, the transfer of issuance files to the EBT system now occurs within the same building, rather than requiring a transfer from Harrisburg to Reading. In addition, the redesigned system automatically checks the date on the issuance file, reducing the chance of double postings. Finally, improvements in system reliability and performance have resulted in fewer manual transactions during system downtime.¹

Estimated losses. Most of the respondents felt that the potential for losses due to excessive authorizations is slightly lower in the redesigned EBT system than in the original system. The main reason given for the reduction in vulnerability was the increased control over the double posting of issuances. They also cited the more secure operating environment of the redesigned EBT system (e.g., the issuance file is no longer physically transferred from Harrisburg to Reading) and greater system reliability, as reasons for lower expected losses in the redesigned system. The experts estimated that losses would be reduced between zero and 50 percent compared with the original system, with an average reduction of 23 percent.

Based on these opinions, we estimate the expected losses in the redesigned EBT system to be about 0.04 percent of benefits (20 percent lower than in the original system). This percentage translates into expected losses of \$0.05 per household per month due to excessive authorizations.

As in the original demonstration, some of these losses might be recovered through recoupment procedures. Assuming about half of the losses are recovered, net losses are estimated to be about 0.02 percent of benefits, or less than 3 cents per household per month.

¹Manual transactions in the redesigned system represent about 0.3 percent of all transactions. Some of these manual transactions are occurring at stores that are new to the demonstration and are waiting for EBT equipment. Manual transactions that are done when the system is not down include an on-line check of the recipient's remaining balance, so there is little possibility of overdraft.

4.2 EXCESSIVE REDEMPTION CREDITS

Redemption of food stamp benefits by food retailers in the EBT system differs considerably from the ATP/coupon system. To redeem coupons, a grocer endorses them and deposits them in a local bank along with a Redemption Certificate. The local bank credits the grocers' account and sends the coupons to the Federal Reserve branch bank.

In the EBT system, grocers receive credit electronically for the food stamp purchases made at their stores by demonstration households. EBT transactions are credited immediately to the retailer's EBT system account. At the end of the accounting period (2:00 p.m. daily), the EBT system totals the credits of each retailer and prepares a tape to transfer funds to the retailers' bank accounts. In the original demonstration, the tape was incorporated in the daily ACH transmission of American Bank & Trust. During the extended demonstration, Commonwealth National Bank in Harrisburg is the system's clearinghouse bank.

The EBT clearinghouse bank makes a wire funds transfer request to the Federal Reserve Bank in New York for the amount of retailer credits. The Federal Reserve simultaneously credits the clearinghouse bank and draws down the USDA's letter of credit for the demonstration.

EXCESSIVE REDEMPTION CREDITS IN THE ATP/COUPON SYSTEM

Excessive redemption credits can occur in the coupon system if a grocer accidentally or intentionally inflates the value on the Redemption Certificate of the coupons redeemed, and this discrepancy is not discovered by the bank. Additionally, banks may (accidentally or intentionally) inflate the value of the deposit document they send to the Federal Reserve branch, and this discrepancy may go unnoticed.

The losses that occur due to excessive redemption credits appear to be fairly small in the coupon system. Interviews with bank personnel suggested that small discrepancies are found only occasionally, and that the errors are usually small dollar amounts.

Estimated Losses. Based on interviews with bank personnel during the extended demonstration, losses due to excessive redemption credits are estimated to be about 0.01 percent of benefits issued. This percentage represents 1 cent per household per month in losses due to excessive credits.

According to bank officials, all of the discrepancies found are corrected, so that these errors do not directly increase program costs. Net losses to the Food Stamp Program, therefore, are estimated to be close to zero.

EXCESSIVE REDEMPTION CREDITS IN THE ORIGINAL EBT SYSTEM

The EBT system reduces the active role of retailers and banks in the redemption process; the EBT system initiates and completes the settlement process automatically. While the EBT system eliminates the potential for inflated coupon deposit claims submitted by merchants or banks, other vulnerabilities exist that may lead to excessive redemption credits. Excessive redemption credits in the EBT system are defined as situations in which the amount electronically credited to a retailer's bank account exceeds the value of benefits redeemed by recipients at that retailer's store.

Excessive redemption credits could occur in the EBT system through a number of potential vulnerabilities. Examples include the addition of fictitious store accounts to the system, alteration of the credits to legitimate grocers' accounts, or retailer additions to the dollar amounts transmitted to the EBT Center. In addition, alteration of the wire funds transfer tape could potentially increase the credits in grocers' accounts. Manipulation of grocers' accounts at the EBT Center or on the funds transfer tape could, in principle, be attempted by either someone in the EBT Center or an outsider, such as the grocer.

The original EBT system contained a number of control measures to reduce the vulnerability of the system to alteration or addition of grocers' accounts in the redemption credit process. System reconciliation reports provided the primary controls. Reconciliation reports identified any retailer account that was not in balance and checked the daily system balance. Also, a daily check was done to confirm that the amount sent to the clearinghouse bank was the same as the amount that the bank transmitted in the ACH. In addition, the FNS Minneapolis Computer Support Center performed reconciliation of weekly total retailer deposits on the EBT system with drawdowns on the demonstration's letter of credit.

The original EBT system also used several control measures to deter creation of fictitious retailer accounts on the EBT system. First, all new

retailer accounts added to the system follow the clearance procedure for opening an ACH destination account. In addition, physical and personnel security procedures were intended to limit the potential threat from insider manipulation of retailer accounts or creation of fictitious retailer accounts.

Only a few instances of accidental excessive redemption credits were discovered during the original demonstration. For example, in one incident an unknown system error caused a retailer to be overcredited by \$600.¹ During Phase B of the extended demonstration, another software error (in the original EBT system) caused several retailer accounts to be credited in error. Generally, PDPW contacts the retailer to correct these types of errors.

Another potential vulnerability is that the clearinghouse bank's wire funds transfer request might exceed the total retailer credits. Discrepancies between letter-of-credit drawdowns and total retailer redemptions were detected on several occasions during the original demonstration. Usually these errors were corrected by adjustments to the clearinghouse bank's requests over the day or two following the discovery of the error.

The expert respondents saw several potential threats to system integrity that could lead to excessive redemption credits. One respondent argued that the lack of merchant control files presented the possibility that false transaction messages entered into the system would go unnoticed. (A merchant control file is used to check whether a transaction message is being sent from a known terminal at a participating retail location.) The respondent estimated very small potential losses associated with this vulnerability, however.

Most of the respondents argued that the most serious vulnerability arose from the nearly unlimited access of one or more EBT Center employees to the system and databases. For example, in the original EBT system the EBT Center Director could have made changes to the database without a complete audit trail. Several respondents felt that an insider could find a way to redirect small amounts of funds into his or her own account, or into a colluding retailer's account, without being noticed. Respondents noted that if retailers do not reconcile their EBT terminal journal tapes to their bank

¹William L. Hamilton et al., op. cit., p. 96.

deposits, and if system reconciliation reports are not carefully reviewed, small amounts of missing funds, even over a period of time, might not be noticed. These respondents did, however, generally place a low probability of occurrence on this potential threat.

One respondent estimated a much higher probability for the likelihood of an insider "attack" on the system and much higher potential losses from such an occurrence. This respondent envisioned a computer programmer, for instance, figuring out a way to divert an entire month's issuance file to a fictitious retailer account, and absconding with the funds. Because of the level of access permitted in the original system, this respondent estimated the likelihood of this scenario as occurring once in ten years.¹

Estimated Losses. The main vulnerabilities emphasized by the expert respondents were the potential for excessive redemption credits due to software errors or to tampering with merchant accounts, and the threat of losses resulting from the access to the system by certain employees. The experts estimated very small losses due to software errors, and noted that most of these losses would be recovered. The vulnerability from tampering by outsiders was also thought to be fairly low, because of the difficulty of accessing the funds and the low potential payoff. The vulnerability of the system to insider fraud, while still low, was considered the most serious threat.

The respondents' estimates of expected losses due to excessive credits varied widely, mainly due to differences in their assessments of the probability of fraud by someone at the EBT Center. The expected loss estimates ranged from 0.01 to 0.84 percent of benefits issued. Based on these responses, we estimate the expected losses in the original EBT system to be about 0.20 percent of benefits, or \$0.26 per household per month. This loss estimate approximately averages the disparate estimates of the expert respondents. Despite the range of estimates, most of the respondents emphasized that allowing unlimited access by even one or two persons increases the potential for large losses to the system.

¹This "big hit" scenario could be viewed as also possible in the other categories of vulnerability. However, we include its probability only once in the loss estimates, on the assumption that one big hit would lead to much stricter controls to prevent future incidences of the same magnitude.

It is worth noting that no cases of fraudulent activity by employees were found during the original or extended demonstrations. No losses due to insider fraud are known to have occurred during the demonstrations; nonetheless, the expected loss estimate reflects the concerns of the expert respondents about employee access to the live system and databases.

It is also important to note that the system's vulnerability to insider fraud could be substantially reduced by implementing relatively simple control strategies, such as complete and clear audit trails and dual responsibility for changes made to the system software or databases. The respondents generally believed that such controls would be implemented in a larger, non-demonstration EBT system. Their estimates of expected losses would be considerably lower in that case. With tighter controls on system access and software changes, expected losses due to excessive credits would be estimated to be about 0.02 percent of benefits, or \$0.02 per household per month.

Some of the losses due to excessive redemption credits would likely be recovered by the Food Stamp Program. Excessive credits caused by software errors, for example, would probably be corrected once discovered, and the losses would be recovered from retailers.¹ The probability of recovering losses due to fraudulent activity is more difficult to estimate. Recovery of fraudulent losses would depend upon detection of the loss and catching the perpetrator. If we assume that about half of the losses due to fraudulent credits are recovered, then net losses due to excessive credits would be about 0.10 percent of benefits.

If the additional controls on insider access were implemented, net losses due to excessive credits would be about 0.01 percent of benefits. This net estimate assumes that about half of the excessive credits are recovered.

EXCESSIVE REDEMPTION CREDITS IN THE REDESIGNED EBT SYSTEM

Procedures for crediting retailers in the redesigned EBT system are very similar to those used in the original demonstration. Several changes

¹One overcrediting of a retailer that occurred during Phase B was resolved by having the retailer submit a check to FNS for the amount of overpayment.

were made, however, to the control strategies in the Phase C system intended to limit the vulnerabilities to excessive redemption credits. The redesigned system uses merchant and terminal control files that identify the terminal where the transaction originates and keep track of all participating retailers. In addition, merchants can more easily reconcile their accounts by calling an audio response unit for information on the previous day's EBT deposits to their accounts.

Other changes made to the redesigned EBT system may increase the vulnerability of the Phase C system. The lack of a separate software development facility for testing software changes increases the possibility that software errors could be introduced when changes are made to the system software. Respondents also expressed concern over the continued complete access to the system available to one or more persons. Respondents also noted that the existing control strategies to restrict access are not always being used properly. Passwords, for example, have not been updated on a regular basis. While noting that the probability of fraudulent activity by employees is very low, one respondent argued that a change of personnel could alter that probability.

Actual incidences of erroneous excessive credits occurred infrequently during Phase C of the extended demonstration. On one occasion, four transactions were processed twice, overcrediting retailers by \$18.44. In addition, Commonwealth National Bank's wire funds transfer requests have been in error on a few occasions, including one overpayment of \$70,000.¹ In all of the above cases, corrections were made when the errors were discovered. No incidences of fraudulent overcrediting were discovered during the extended demonstration.

Estimated losses. Most of the expert respondents saw little reason to expect differences in losses between the redesigned and original EBT systems, based on the small design differences between the two systems. One respondent expected slightly lower losses because of the use of merchant and terminal control files. Another respondent estimated a small increase in

¹The wire funds transfer errors usually occurred when a bank employee accidentally transposed digits in the dollar amount of the request. In all cases, the errors were corrected by having the bank reduce the dollar amount of subsequent wire funds requests.

vulnerability due to the lack of a separate software development facility. Most respondents continued to emphasize the potential vulnerability represented by the complete access to the system by a small number of employees.

We estimate the expected losses due to excessive redemption credits to be the same in the redesigned EBT system as in the original system, based on the similarities in vulnerabilities and controls between the two systems. Expected losses in the redesigned system, therefore, are estimated to be 0.20 percent of benefits, or \$0.26 per household per month.

The estimate of expected losses due to excessive credits reflects the respondents' assessments of the potential for insider fraud. As in the case of the original EBT system, the estimate of expected losses would be substantially reduced by the addition of control strategies designed to limit that access and to provide complete audit capability for software or database changes. In fact, PDPW is already in the process of developing and implementing two important control strategies: a separate software development facility and an explicit process for changes to software or databases with complete audit capability. With these control strategies in place, the expected losses due to the vulnerability to a "big hit" would be reduced considerably. Expected losses due to excessive credits in a system with these additional controls are estimated to be about 0.02 percent of benefits, or \$0.02 per household per month.

We expect that the recoveries of losses in the redesigned system would be similar to the original EBT system. Losses due to errors are likely to be recovered; losses caused by fraudulent activity may be more difficult to recover. Net losses are therefore estimated to be about 0.10 percent of benefits in the redesigned EBT system, assuming that about half of the fraudulent credits would be recovered. If additional controls on insider access were implemented, net losses would be estimated to be about 0.01 percent of benefits.

4.3 BENEFITS LOST DURING PRODUCTION AND HANDLING

The use of the paper coupon as the physical representation of food stamp benefits creates opportunities for losses during production, storage and handling of the coupons. An EBT system does not have an analogous physical representation of benefits.

COUPON LOSSES

Losses can occur at a number of points in the coupon production and handling process. Coupons can be stolen during production, shipment or storage. Coupons can be recycled, i.e., taken out of the redemption process and reused. Counterfeit coupons could be produced. While most of these losses are not measured by a formal reporting system, estimates of losses can be made based on information from interviews with persons knowledgeable about coupon procedures and reported incidences of theft, loss and counterfeiting.

Coupons can be stolen from the printing companies, from storage locations, or from issuance agents. Thefts of large amounts of coupons are fairly rare. However, the amount of small thefts is not measured in a formal reporting system. Based on interview data about the frequency and size of thefts, we estimate coupon losses to theft to be less than 0.001 percent of benefits, or about one-tenth of a cent per household per month.

Even when thefts of coupons occur, much of the loss does not represent a direct increase in program costs. Some stolen coupons are recovered, and other losses are covered by insurance. The net losses to the Food Stamp Program are therefore estimated to be even less than 0.001 percent of benefits issued.

Losses due to counterfeit and recycled coupons are also expected to be quite small when compared with benefits issued. Interview data indicate that, nationally, about \$20,000 in counterfeit coupons are discovered annually. Respondents would not hazard a guess as to the possible level of undetected counterfeit coupons. Even if we make the conservative assumption that twice that amount goes undetected, the losses due to counterfeit coupons would represent less than 0.001 percent of benefits issued. Recycling of coupons is thought to be quite rare, so we estimate losses from recycled coupons to be close to zero percent of benefits issued.

The other major vulnerability in coupon production and handling is coupon losses from issuance agents. For example, a recipient may accidentally (or intentionally) be given too many coupons by an issuance agent. Coupons could also be stolen from issuance agents. Thefts of small amounts of coupons may be indistinguishable from accidental overissuance of coupons to recipients.

Data on coupon losses from issuance offices are reported on the FNS Form 250. These data indicate that during Phase C of the extended demonstration, coupon losses from issuance offices for the state of Pennsylvania were about 0.02 percent of benefits issued.¹

Issuance agents are responsible for coupons in their possession, so these losses may not add directly to Food Stamp Program costs. Losses from issuance agents are subtracted from fees paid to the agents by the Food Stamp Program. Assuming that these losses are recovered from issuance fees, net losses to the Food Stamp Program would be approximately zero.

Summary of Coupon Losses in Production and Handling. The reported data combined with interview estimates indicate that coupon losses in production and handling are about 0.02 percent of benefits. In dollar terms, coupon losses in production and handling are \$0.02 per household per month.

Some of the losses in production and handling of coupons can be recovered, either from the perpetrators or from the parties held liable for the coupons' security. Net coupon production and handling losses, therefore, are estimated to be approximately zero to the Food Stamp Program.

EBT LOSSES

The expert respondents could not identify any vulnerabilities in the original or redesigned EBT systems that are equivalent to production and handling losses in the ATP/coupon system (excluding the vulnerabilities included in other categories). As a result, losses in this category are estimated to be zero for the original and redesigned EBT systems.

4.4 BENEFITS LOST BY OR STOLEN FROM RECIPIENTS

Food stamp benefits lost by or stolen from recipients and used by others are considered to be diversions of benefits -- they do not add directly to program costs, but they detract from achievement of program purposes. In the ATP/coupon system, recipients are responsible for the safekeeping of their coupons after they have exchanged their ATPs for the coupons. If these coupons are lost or stolen from recipients, they are not replaced by the Food

¹Data are for the period October 1987 - March 1988.

Stamp Program. Similarly, in the demonstration system in Reading, benefits stolen from a recipient's account are usually not replaced. Benefits potentially could be stolen from a recipient's EBT account in a number of ways, such as through unauthorized use of the recipient's card, by means of a counterfeit card, or through tampering with the system files.

LOSS OR THEFT OF BENEFITS FROM RECIPIENTS IN THE ATP/COUPON SYSTEM

The principal vulnerability for recipients in the ATP/coupon system is loss or theft of coupons, because the coupons are not replaced by the Food Stamp Program. In addition, recipients using coupons may be illegally overcharged for their groceries (or have the value of their coupons discounted) by food retailers.

The main sources of information available on coupon loss and theft in the Reading area and on grocer overcharging are the recipient surveys conducted for the evaluation of the original demonstration. Two surveys were conducted in 1985 with food stamp recipients living in Berks County outside of the demonstration area.

There is also some information on these types of coupon losses from the extended demonstration. In the last monitoring survey of recipients during the extended demonstration, respondents who had previously used coupons were asked about incidences of coupon loss or theft and grocer overcharging. While the information from the extended demonstration is more recent, the monitoring surveys used samples of only about 30 recipients. In addition, the recall period could have been quite long for some of these respondents, who may have been using the EBT system for a year or more. We rely, therefore, on the survey responses from the original demonstration for the estimates of coupon losses from recipients.¹

¹The reported rates of coupon loss and theft and of grocer overcharging from the monitoring surveys, however, were similar to the rates estimated in the original demonstration.

The recipients' responses to the surveys conducted during the original demonstration indicated that, on average, about 12 percent of households reported one coupon loss or theft per year.¹ The average loss was reported to be \$64 in benefits. Recipient losses due to coupon theft or loss are estimated to be 0.54 percent of benefits based on these reports.

The surveys of food stamp recipients during the original demonstration also asked respondents about occurrences of grocer overcharging (either accidental or intentional). Respondents' reports suggest that 25 percent of households encounter some instance of overcharging or discounting of coupons during a year; the value of benefits lost was reported to be about \$6 per incident, on average. These reported figures indicate that about 0.11 percent of benefits are lost to recipients by grocer overcharging.

Summary of Estimated Diversions. Based upon respondent reports in the original demonstration surveys, diversions due to loss and theft of coupons are estimated to be 0.54 percent of benefits. Recipient losses due to grocer overcharging are estimated to be about 0.11 percent of benefits, based on survey results. Total diversions, therefore, represent an estimated 0.65 percent of benefits issued in the ATP/ coupon system. This percentage represents \$0.86 in benefits per household per month, based on the FY 1988 issuance amount per household for the United States.

These estimates may overstate the loss and theft of benefits from recipients because people reporting the frequency of rare events often overestimate them, especially for events involving problems or losses. Estimates of these losses by recipients, therefore, should be interpreted with some caution.

Recipient losses due to coupon loss or theft and due to grocer overcharging are included in Chapter 6 as part of the costs incurred by recipients for participating in the Food Stamp Program. To avoid double counting, the estimate of net diversions due to loss and theft of benefits from recipients subtracts out these "costs". Net diversions due to loss or theft from recipients, therefore, are zero.

¹William L. Hamilton, et al., op. cit., p. 100.

LOSS OR THEFT OF ELECTRONIC BENEFITS IN THE ORIGINAL EBT SYSTEM

While demonstration participants no longer need to safeguard paper coupons, there is still potential for loss and theft of their food stamp benefits in the EBT system. Benefits could be stolen from a recipient's EBT account in a number of ways, such as through unauthorized use of the recipient's card, by means of a counterfeit card, or through tampering with the system files.

The largest threat to recipients' EBT benefits appears to be through using an EBT card -- either the recipient's own card or a counterfeit card. To access a recipient's account with an EBT card, however, requires use of the recipient's personal identification number (PIN). Recipients are instructed during training to keep their PINs secret and to not write them on their cards. Nonetheless, if the PIN is known, the recipient's card, or an encoded counterfeit card, could be used to make food purchases using the recipient's benefits.

The expert respondents expressed concern over the lack of security over PINs in the original demonstration system. For example, two or more local office staff had access to the PIN during card encoding procedures. Of less concern, though still a potential vulnerability, was the transmission of the unencrypted PIN over telephone lines when using the audio response unit for balance information. Respondents generally thought that the potential threat was greater from access to the PIN by local staff than the threat from tapping of phone lines to learn PINs (because the latter is much more difficult).

Another potential threat to recipients' accounts may arise because of the apparent practices of retailers during system slowdowns. Some recipients report that when the system is down or slow, they leave their EBT cards and PINs at the store for later processing of the transactions. This action may expose recipients to having benefits stolen by the retailer or a clerk, or by someone who steals the card from the store. While the likelihood of theft may be low in this case, the scenario indicates how improper procedures can increase vulnerabilities for recipients.

Recipients could also have their benefits stolen by someone tampering with the system. Tampering with system files potentially could be

done by an outsider, a merchant, or someone at the EBT Center. Respondents generally thought that the expected losses from this vulnerability were low, because of the difficulty in accessing the benefits. Also, several control strategies in the original EBT system were intended to limit this vulnerability. For example, transaction messages included the PIN offset, terminal ID, and message authentication code to permit identification of unauthorized transactions.

In addition to the above vulnerabilities, recipients using the EBT card can still be overcharged by grocers, i.e., have the value of their benefits discounted. Overcharging can be accidental or intentional, and shoppers making purchases with cash or other payment forms can also be overcharged. One concern specific to the EBT system, however, is that cashiers could (accidentally or intentionally) key in \$50 instead of \$5, for example, when processing an EBT transaction.¹ Despite the possibility of these entry errors, the expert respondents believed recipients' overall vulnerability to grocer overcharging to be the same in the original EBT system as in the ATP/coupon system.

Estimated Diversions. Including all forms of possible loss or theft of benefits from recipients, the expected level of diversions in the original EBT system was estimated to be less than in the ATP/coupon system. The primary potential diversion in the original EBT system was seen to be the use of counterfeit cards to access recipients' accounts. The respondents' estimates of total expected losses were fairly consistent, ranging from 0.18 to 0.40 percent of benefits. The "consensus" of these estimates is that expected losses would be about 0.26 percent of benefits, or \$0.34 per household per month. This estimate is less than half of the expected coupon losses from recipients, primarily due to the decrease in theft of EBT benefits compared to coupons.

¹The recipient would notice the discrepancy if he or she compares the cash register receipt with the EBT receipt.

LOSS OR THEFT OF ELECTRONIC BENEFITS IN THE REDESIGNED EBT SYSTEM

The vulnerability of the redesigned EBT system to loss and theft of benefits from recipients is very similar to the vulnerability of the original EBT system. The main vulnerability, according to the expert respondents, remains the threat of counterfeit cards used to access recipients' accounts. In the redesigned system, local office staff see the card number and PIN offset in addition to the PIN. This information would allow a perpetrator with a counterfeit card to encode the card and access the recipient's account.

An additional vulnerability seen in the redesigned system is the possibility of software errors leading to loss of benefits from recipients' accounts because of the lack of a separate software development facility.

Three of the expert respondents estimated an increase in recipient losses in the redesigned EBT system, primarily due to the reduction in control over separation of PIN and card encoding procedures. These estimates ranged from 0.01 to 0.33 and averaged 0.13 percentage points higher than their loss estimates for the original EBT system. One respondent also emphasized the increase in potential losses due to the fact that security access codes are not updated on a regular basis.

In contrast, one respondent felt that losses from recipients would decrease slightly because of the addition of merchant and terminal control files. These control files make tampering with accounts more difficult.

Estimated Losses from Recipients in the Redesigned EBT System. The estimate of diversions due to benefits lost by or stolen from recipients is 0.30 percent of benefits, or \$0.39 cents per household per month, based on the expert respondents' assessments.¹ The estimate includes a small increase in potential losses to recipients due primarily to the reduced controls over access to PINs and lack of updating of security access codes. This estimate assumes no change in grocer overcharging compared with the original EBT system.

¹While no respondents reported stolen EBT benefits in the monitoring surveys, the estimate represents the experts' assessment of the potential for losses and thefts from recipients.

4.5 RECIPIENTS' USE OF BENEFITS IN AN UNINTENDED MANNER

The other major type of diversion of benefits is the use of benefits by recipients in an unintended manner. This category includes diversions that violate Food Stamp Program rules, such as buying ineligible items with food stamps or selling benefits for cash. It also includes purchasing non-food items with cash change from food stamp purchases. This action does not violate Food Stamp Program rules (unless repeated small purchases are made to generate change), although it detracts from the program's intention that benefits be spent on food.

UNINTENDED USE OF BENEFITS IN THE ATP/COUPON SYSTEM

Purchase of Ineligible Items with Food Stamp Benefits. Recipients sometimes use coupons to purchase ineligible items from grocery stores, in violation of Food Stamp Program rules. Retailers or clerks may allow these purchases by willfully or accidentally overlooking the purchase, or may be ignorant of the regulations.

The Food Stamp Program conducts educational programs to teach recipients and retailers about the regulations and penalties. As a deterrent to such purchases, recipients and retailers agree in writing to comply with Food Stamp Program rules and acknowledge the penalties for violations of those rules. As a further control measure, investigations of stores are conducted based on tips and on statistical monitoring of store redemptions. A retailer may be suspended from the program or fined for violating rules on eligible items.

There are no regular reporting system data on the frequency or value of recipient purchases of ineligible items from authorized merchants. However, interviews were conducted with FNS Compliance Branch staff during the evaluation of the original demonstration. Based on this source of information, diversions of benefits by means of purchases of ineligible items are estimated to be 0.17 percent of food stamp benefits, or \$0.22 per household per month.

Selling Benefits for Cash. The practice of selling benefits for cash or other goods and services is often referred to as "trafficking." Trafficking can occur either between a food stamp recipient and an authorized

retailer, or a recipient and a third party. To redeem the coupons, the third party must use the coupons to buy food, or sell the coupons to an authorized retailer.

The control measures designed to limit trafficking are essentially the same as those described above to limit purchases of ineligible goods. Educational programs and written acknowledgment of program rules and sanctions are required of retailers and recipients. Sanctions are imposed on retailers found accepting coupons for cash.

Estimates of trafficking are based on interview data from the evaluation of the original demonstration. Selling benefits for cash is estimated to account for 0.39 percent of benefits, or about \$0.51 per household per month.

Cash Change from Coupon Purchases. If change is required from a coupon purchase, retailers may give the recipient up to 99 cents in cash change. There are no restrictions on how recipients may use this cash change, though Food Stamp Program rules prohibit the making of repeated small purchases to generate change.

The use of cash change for purposes other than the purchase of eligible food items is considered to be a diversion of benefits away from the intent of the program. Yet allowing change up to 99 cents is a realistic compromise to the tradeoff between the cost of alternative solutions (such as paper change) and the diversion of benefits to unintended uses.

The average amount of change given in all purchases is 50 cents, assuming that the amount of change is uniformly distributed between 0 and 99 cents. Based on the average purchase value for the Phase C EBT system, \$15.28, about 2.7 percent of benefits becomes cash change. Some of this change will probably be used to buy food. If recipients use about 45 percent¹

¹This calculation assumes that the average coupon purchase is the same as the average EBT purchase. The estimate that recipients spend 45 percent of income on food is based on the study of food stamp recipients by Jain-Shing A. Chen, "Simultaneous Equations Models with Qualitative Dependent Variables: A Food Stamp Program Participation and Cost Analysis." Columbia, Missouri: University of Missouri, unpublished doctoral dissertation, 1983.

of this change on eligible food items at a later date, then the remainder is considered a diversion of benefits. We estimate, therefore, that 1.8 percent of benefits is cash change from coupon purchases used to buy ineligible items.

Estimated Diversions. Given the estimates indicated above, diversions of benefits due to purchases of ineligible items, trafficking and cash change in the coupon system sum to 2.36 percent of benefits. This percentage is equivalent to \$3.11 per household per month diverted from intended use.

UNINTENDED USE OF EBT BENEFITS

Some of the same diversions of benefits from intended use are possible in the EBT system. For example, a recipient could exchange benefits for cash if a participating grocer is willing to process a EBT transaction and give the recipient cash. Purchases of ineligible items can occur in the EBT system as well. The EBT system does eliminate cash change, however, since the recipient's account is debited for the exact amount of the purchase.

The expert respondents saw no difference between the redesigned and original EBT systems with regard to the vulnerabilities and control strategies in this category. The diversion estimates discussed below are the same for both EBT systems.

Purchase of Ineligible Items. The vulnerability of the EBT systems to purchases of ineligible items is essentially the same as in the coupon system. The control measures are also the same as in the coupon system: educational programs, investigations, and sanctions.

The expert respondents generally agreed that there would be little change in the purchases of ineligible items in the EBT systems compared with the coupon system. Therefore, the diversions due to ineligible purchases are estimated to be 0.17 percent of benefits.

Trafficking. Recipients who violate Food Stamp Program rules and sell their benefits for cash can either do so by selling the benefits to an authorized retailer, or to a third party. The EBT systems make the selling of benefits to third parties somewhat more difficult, because of the need for a terminal, the recipient's card, and the recipient's PIN in order to access the benefits.

The expert respondents felt that some reduction in trafficking would occur in the EBT systems, primarily through a reduction in third party involvement. One respondent thought that even the selling of benefits to retailers would be reduced, as the illegal transaction would now have to occur in the checkout lane (at a terminal), potentially in view of other customers or employees. Two respondents thought trafficking would be reduced by 50 percent, another two estimated reductions of only 10 percent. The other respondents felt trafficking would not decrease, or might even increase somewhat.

Based on the respondent's assessments of the impact of EBT systems on trafficking, we estimate the diversion of benefits due to trafficking to be

about 0.31 percent of benefits. This estimate represents a reduction of about 20 percent in trafficking compared with the coupon level, based on the greater difficulty in selling benefits to third parties (and redeeming those benefits). This estimate translates into \$0.41 per household per month in trafficked benefits in the EBT systems.

Cash Change. The EBT system debits the exact amount of the recipient's purchase from his or her EBT account, thereby eliminating the need for cash change to be given in EBT purchases. To convert benefits to cash in the EBT systems (aside from trafficking), recipients would have to purchase food with their EBT cards and then sell the food for cash. While this diversion is possible, it is clearly more complicated than the diversion of cash change in the coupon system. The expert respondents generally thought that this type of diversion would be very small. Based on this assessment, we estimate the diversion to be about 1 percent of the level in the coupon system, or about 0.02 percent of benefits.

Summary of Estimated Diversions from Intended Uses. In both EBT systems, the expected diversions of benefits from intended uses are estimated to be the same, as there are no differences between the two systems in control strategies to deal with these vulnerabilities. The amount of benefits diverted from intended uses is expected to be about 0.50 percent of benefits issued. This estimate translates into \$0.66 percent of benefits per household per month. The estimate of benefits used in an unintended manner in the EBT system is about 80 percent lower than these diversions in the coupon system. The largest reduction in diversions is due to the elimination of cash change.

Some reduction in trafficking in the EBT system was also estimated by the expert respondents.

4.6 LOST RETAILER CREDITS

In both the ATP/coupon and EBT systems, some potential exists for retailers not to receive credit for groceries paid for with food stamp benefits. While these potential losses to retailers are discussed as part of retailers' costs of participation (see Chapter 5), they are included here as well because the EBT-related losses arise directly from vulnerabilities in EBT system operations.

LOST RETAILER CREDITS IN THE ATP/COUPON SYSTEM

Retailers lose credit for food stamp coupon sales if the coupons are lost before being deposited at a bank or if the bank errs when counting the coupons submitted for deposit. Based on information provided during the retailer interviews, the frequency and magnitude of such errors are so small that they amount to less than 1 cent per \$1,000 of benefits redeemed.

LOST RETAILER CREDITS IN THE EBT SYSTEMS

The EBT system in both the original and extended demonstrations may be vulnerable to two problems that potentially expose food retailers to losses. These two vulnerabilities -- transaction reversals and database disasters -- are different from the vulnerabilities discussed earlier in that they are unlikely to lead directly to increased costs for the Food Stamp Program or to diversion of benefits. In both cases discussed below, recipients receive food but retailers may not receive credit for the food purchased.

Transaction Reversals. Transactions are reversed whenever the EBT system cannot complete all steps of transaction processing. A reversal may occur, for example, if poor lines cause incomplete transmission of a message. When the reversal occurs, all database records are returned to their original status. Thus, if a reversal occurs during a purchase transaction, the retailer's account is not credited and the recipient's account is not debited.

If the cashier notices that the EBT system did not complete a transaction (e.g., no receipt is printed), he or she can re-enter the

transaction. If, however, the reversal is not noticed (e.g., the cashier assumes simply that the printer is not working), the recipient takes the groceries home but the retailer does not receive credit for the sale.

An average of about 200 transaction reversals per month have been occurring during Phase C of the extended demonstration. Most of these reversals are noticed by retailers at the time; the transaction log file shows that most reversals are followed by a completed transaction between the same retailer and recipient. A potential for loss to the retailer arises when the reversal is not noticed by the cashier.

The Berks County Assistance Office (BCAO) monitors transaction reversals daily and identifies those reversals that are not followed by a completed transaction between the same retailer and recipient. For those reversals, the BCAO contacts the recipient and the retailer, and requests that the recipient return to the store to complete the transaction. If the recipient does not return to the store, has spent all his or her benefits, or cannot be located, the retailer could incur a loss for the amount of that sale.

Retailers may also incur losses if neither they nor the BCAO notice a reversal that has not been subsequently completed. There are no data, however, on the frequency of this occurrence.

Reversed transactions clearly introduce a potential for loss to retailers, but their loss exposure appears to be quite small in this case. The BCAO identifies one or two reversals per week that require notification of the recipient. In only a very few instances have there been problems in locating the recipient or obtaining their cooperation. Losses to retailers are therefore expected to be very close to zero.

Database Disaster. One expert respondent raised the possibility of losses caused by destruction of the system databases. The potential for a database disaster is quite low, because of the use of backup tapes, a secure off-site storage facility, and mirrored disk packs.

One feasible (though unlikely) scenario is that a disaster might occur in the computer room or at the computer building that results in the loss of a day's worth of transaction messages. (The transaction file is backed up more often than once a day, but the backup tapes are taken to off-

site storage daily.) In the redesigned system, both of the disk packs would have to be damaged to lose the transaction messages, but the original EBT system did not have the extra security of mirrored disk packs.

A loss of a day's transactions would mean that retailers would not receive credit for EBT purchases on that day, nor would recipients' accounts be debited.¹ The loss incurred by retailers might be as much as the value of a day's worth of EBT sales. Some of the losses could be recovered, however. The terminals record completed transactions on journal tapes for the retailers' records. With the retailers' journal tapes, the BCAO could contact the recipients who made EBT purchases on that day. Some portion of the transactions might not be recovered, either because the retailer did not keep the journal tapes or if some recipients did not cooperate. Nonetheless, the losses to retailers in this scenario are likely to be fairly small.

There are few data on which to base an estimate of the potential losses to retailers caused by a database disaster. In order to provide an estimate of the potential losses, we assume that an entire day's transactions are lost.² If such a database disaster occurs once in ten years, then losses to retailers in this case would be nearly 0.03 percent of benefits issued. Retailers' losses would be lower if some of the transactions were recovered using retailers' journal tapes. If half of the transactions are recovered based on the journal tapes, then losses to retailers would be about 0.01 percent of benefits.

Summary of Potential Losses to Retailers. Two additional vulnerabilities of the EBT system -- transaction reversals and a database disaster -- may lead to losses incurred by food retailers rather than by the Food Stamp Program or by recipients. The expected losses associated with these vulnerabilities appear to be quite low, however. The losses incurred by retailers due to transaction reversals are estimated to be very close to zero. In the case of a database disaster, under pessimistic assumptions retailers might

¹We assume that PDPW would be able to recreate a day's worth of issuance activity so that recipients would not suffer any losses in a database disaster.

²We assume that the expected value of a day's sales is one-thirtieth of \$500,000, which is about the value of a month's issuance.

incur losses as high as 0.03 percent of benefits issued, or about \$0.04 per case month.

4.7 CONCLUSIONS

The chapter has presented estimates of benefit losses and diversions under the ATP/coupon system and the original and redesigned EBT systems. Some of these losses and diversions are recoverable. Accordingly, this section summarizes total gross and net losses and diversions under each system.

GROSS LOSSES AND DIVERSIONS

The estimates of gross losses and diversions in each category of vulnerability are summarized in Exhibit 4-1. The estimates are presented both in terms of the percentage of benefits issued and in terms of dollars per case month. The estimated vulnerabilities are divided into losses, which add to Food Stamp Program costs, and diversions, which do not add directly to program costs. Diversion of benefits detracts from achievement of the objectives of the Food Stamp Program.

Evidence from the original and extended demonstrations suggests that the EBT systems would reduce loss and diversion of benefits in the Food Stamp Program. The overall vulnerabilities of the EBT systems are estimated to be about two-thirds lower than vulnerabilities in the ATP/coupon system. In the EBT systems, estimated gross losses and diversions are between 1.04 and 1.07 percent of benefits issued, while in the ATP/coupon system total losses and diversions are estimated to be 3.15 percent of benefits issued. Most of the decrease in vulnerability results from a reduction in benefit diversions. Compared with the ATP/coupon system, the EBT systems are estimated to reduce the vulnerability of recipients to benefit loss and theft by more than half (from 0.65 percent of benefits to about 0.30 percent) and the unintended uses of benefits by more than three-quarters (from 2.36 percent to 0.50 percent).

While the EBT systems are expected to reduce benefit diversions, gross losses are estimated to be higher in the EBT systems than in the ATP/coupon system. Total expected losses are estimated to be about 0.24 percent of benefits in the two EBT systems, compared with only 0.14 percent in the ATP/coupon system. The higher relative losses in the EBT systems primarily reflect the potential for a "big hit" by one or more employees with

Exhibit 4-1

Summary of Estimates of Gross Losses and Diversions

Vulnerabilities	AIP/Coupon		Original EBT System		Redesigned EBT System	
	% of benefits	\$ per case month	% of benefits	\$ per case month	% of benefits	\$ per case month
<u>Vulnerabilities adding to program costs</u>						
Excessive authorizations	0.11	\$0.14	0.05	\$0.07	0.04	\$0.05
Excessive redemption credits	0.01	\$0.01	0.20	\$0.26	0.20	\$0.26
Losses in production and handling	0.02	\$0.02	0	0	0	0
Subtotal--Losses	0.14	\$0.17	0.25	\$0.33	0.24 ^a	\$0.31
<u>Vulnerabilities detracting from achievement of program goals</u>						
Benefits lost by or stolen from recipients	0.65	\$0.86	0.26	\$0.34	0.30	\$0.39
Benefits used in unintended manner	2.36	\$3.11	0.50	\$0.66	0.50	\$0.66
Lost retailer credits	0	0	0.03	\$0.04	0.03	\$0.04
Subtotal--Diversions	3.01	\$3.96	0.79	\$1.04	0.83	\$1.09
<u>All vulnerabilities</u> ^b	3.15	\$4.15	1.04	\$1.37	1.07	\$1.41

Notes: ^aWith additional controls on insider access, total estimated losses would be 0.06 percent of benefits issued, or \$0.08 per case month.

^bTotal losses do not exactly equal the sum of the component estimates due to rounding.

access to system software and databases. It is admittedly difficult to quantify the probability or likely value of loss due to insider manipulation of the system. Nonetheless, the estimates of losses in the EBT systems reflect concerns of the expert respondents over the level of insider access in the two systems.

The EBT systems' vulnerability to insider fraud could be substantially reduced by the implementation of relatively simple control strategies. In fact, PDPW is already planning to implement two important control strategies: a separate software development facility and development of an explicit process and a complete audit trail for changes made to the system software or databases. These controls would greatly reduce the system's vulnerability to insider manipulation.

With additional controls on insider access, the estimated expected losses in the EBT systems are considerably lower. Assuming such controls are implemented, total expected losses would be estimated at about 0.06 percent of benefits in the redesigned EBT system, compared with the current estimate of 0.24 percent. With the additional controls, then, expected losses would be slightly less than half of the losses in the ATP/coupon system.

Total gross vulnerabilities are very similar for the two EBT systems, reflecting the similarity in the two systems' design and control strategies. Losses are estimated to be slightly lower in the redesigned EBT system because of a more secure operating environment and better control over double posting of issuance files. Expected losses are estimated to be 0.24 percent of benefits in the redesigned EBT system, compared with 0.25 percent of benefits in the original EBT system. These expected losses represent \$0.31 per case month in the redesigned system compared with \$0.33 per case month in the original system.

Benefit diversions are estimated to be slightly higher in the redesigned EBT system compared with the original system. The increase in vulnerability is due to the reduced separation of card issuance and card encoding procedures, and the exposure of the recipient's case number, PIN, and PIN offset to local office staff. Diversions are estimated to be about 0.04 percent higher (or about \$0.05 per case month more) in the redesigned EBT system.

NET LOSSES AND DIVERSIONS

The gross vulnerability estimates are intended to reflect total "leakages" from the Food Stamp Program. Yet, because some of the losses incurred may be recovered by the Food Stamp Program, program costs may not be increased by the full amount of the loss. Estimates of recoveries can be subtracted from the loss estimates to provide estimates of net losses to the Food Stamp Program. In addition, some diversions (such as benefits lost or stolen from recipients and lost retailer credits) are counted as part of recipients' and retailers' costs of participation in the Food Stamp Program. These costs are therefore subtracted out of the measure of net vulnerabilities. For purposes of comparison with the other impacts in this report, the net vulnerability estimates provide an estimate of the "cost" of the vulnerabilities in each system to the Food Stamp Program.

Exhibit 4-2 summarizes the estimated net vulnerabilities in the three systems. Estimated recoveries reduce gross losses in the ATP/coupon system by about half, to 0.07 percent of benefits. Estimates of net losses in the EBT systems are somewhat higher than in the ATP/coupon system. Expected net losses in the redesigned EBT system are estimated to be about 0.12 percent of benefits (without additional controls on insider access to the system). If additional controls were implemented, expected net losses in the redesigned system would be about 0.03 percent of benefits. With the additional controls, therefore, estimated net losses in the EBT system would be less than half of the level of net losses in ATP/coupon system.

Net losses are estimated to be very similar in the two EBT systems. Estimated net losses are slightly lower for the redesigned EBT system, compared with the original system, because of increased controls over duplicate issuances and the more secure operating environment in Phase C.

Because benefits lost or stolen from recipients and lost retailer credits are included in recipients' and retailers' costs, net diversions include only those vulnerabilities related to recipient use of benefits in an unintended manner. Net diversions are considerably higher for the ATP/coupon system than for the two EBT systems: 2.36 percent of benefits in the ATP/coupon system compared with 0.50 percent in either EBT system.

Exhibit 4-2

Summary of Estimates of Net Losses and Diversions

Vulnerabilities	ATP/Coupon		Original EBT System		Redesigned EBT System	
	% of benefits	\$ per case month	% of benefits	\$ per case month	% of benefits	\$ per case month
<u>Vulnerabilities adding to program costs</u>						
Excessive authorizations	0.07	\$0.09	0.03	\$0.04	0.02	\$0.03
Excessive redemption credits	0	0	0.10	\$0.13	0.10	\$0.13
Losses in production and handling	0	0	0	0	0	0
Subtotal--Net Losses	0.07	\$0.09	0.13	\$0.17	0.12 ^a	\$0.16
<u>Vulnerabilities detracting from achievement of program goals</u>						
Benefits lost by or stolen from recipients	0	0	0	0	0	0
Benefits used in unintended manner	2.36	\$3.11	0.50	\$0.66	0.50	\$0.66
Lost retailer credits	0	0	0	0	0	0
Subtotal--Net Diversions	2.36	\$3.11	0.50	\$0.66	0.50	\$0.66
<u>Net vulnerabilities</u> ^b	2.43	\$3.20	0.63	\$0.83	0.62	\$0.82

Notes: ^aWith additional controls on insider access, estimated net losses would be 0.03 percent of benefits issued, or \$0.04 per case month.

^bTotal losses do not exactly equal the sum of the component estimates due to rounding.

The vulnerability estimates used in this analysis must be interpreted with caution. The estimated losses for the EBT systems reflect experts' judgments about system vulnerabilities and the likelihood of exploitation of those vulnerabilities in an ongoing system. The overall trend does appear clear however: total vulnerabilities would be lower in the EBT system than in the ATP/coupon system. Not all of this reduction in vulnerabilities will mean lower taxpayer costs, however. Much of the reduction in vulnerabilities is due to decreases in benefit diversions, rather than in losses. Nonetheless, reductions in gross losses, trafficking, and cash change used to buy ineligible items would be likely to improve the public perception of the level of fraud and abuse of benefits in the Food Stamp Program.

Chapter Five

EFFECTS OF THE EBT SYSTEM ON PARTICIPATING FOOD RETAILERS

When an EBT system for the Food Stamp Program in Reading, Pennsylvania, was first considered in 1982, food retailers expressed concern about the potential impact of the system on store operations. Specifically, food retailers identified four areas of potential harm: productivity at the checkout counter, system costs, consumer concerns, and impacts on independent operators.¹

The evaluation of the original EBT demonstration examined these and other issues and concluded that most concerns about negative EBT impacts on retailers never materialized.² Most retailers (66 percent) preferred the EBT system to the coupon system, and -- relative to the coupon system -- retailers' costs to participate in the Food Stamp Program declined. These conclusions were further strengthened at the end of the demonstration when retailers lobbied for an extension of the demonstration.

The 15-month Phase B period following extension of the demonstration (and relocation of the system computers to Harrisburg) was relatively uneventful from the retailer perspective. PDPW operated the original system during this time and system performance continued at levels which were typical of the latter stages of the original demonstration. System operations at retail stores during Phase B also were unchanged -- retailers used the same store equipment (i.e., terminals, PIN pads, and printers) and followed the same procedures when processing transactions as they had since the system's inception.

As PDPW prepared to implement the redesigned EBT system (the Phase C period of system operations), interest in retailer impacts was renewed. Program officials believed the redesigned system would benefit retailers and improve some negative aspects of the original system. Enhanced system hardware and software were expected to improve system reliability and

¹Letter from Harry Sullivan, Senior Vice President and General Counsel of the Food Marketing Institute, October 18, 1982.

²William L. Hamilton, et al., op. cit. pp. 173-175.

processing speeds. Earlier retailer complaints of difficulty reconciling EBT sales with credits to retailer bank accounts would also be addressed. The redesigned system featured an audio response unit called VIPS (or Voice Information Processing System) which retailers could call and hear a recorded message of their most recent deposit amount. The redesigned system also could be modified to allow retailers to select the time at which EBT sales are totaled for the day -- further mitigating retailer reconciliation difficulties.¹

At the same time, implementation of the redesigned system entailed some uncertainty. The new system completely redesigned the way the system processed information, even though retailers continued to use the same EBT equipment and followed the same procedures when processing transactions. Comprehensive system testing was performed and satisfactorily completed, but acceptable performance could not be foreseen with certainty.

KEY HYPOTHESES

Given the uncertainty over exactly how the redesigned system would impact retailers, the analyses presented in this chapter address two general sets of questions: how retailers perceive the redesigned system, and the costs retailers incur to participate in the Food Stamp Program under the redesigned system.

The primary focus of the analysis is to measure these impacts relative to the food stamp coupon system. While the analysis also compares the redesigned and original EBT systems, the more useful comparisons are between the redesigned system and the paper coupon system, which present greater contrasts in their means of benefit delivery and redemption.

The analysis of retailer perceptions and opinions about the EBT system investigates the following questions:

- How do retailers perceive the level of system problems with the redesigned system, and how disruptive are these problems to store operations?

¹The latter modification, however, has not been implemented.

- Among the paper coupon and two EBT systems (i.e., original and redesigned systems), which system do retailers prefer, and why?
- What impacts on participation costs and store operations have retailers perceived since introduction of the redesigned system?

Because plans for the redesigned system involved little change to in-store EBT procedures, retailers were not expected to perceive significant impacts on system operations or participation costs after implementation of the Phase C system. For the same reason, retailers' preferences for the EBT and coupon systems were not anticipated to vary greatly from the levels measured during the original demonstration.

The second set of questions concerns retailer participation costs:

- What are retailers' EBT and coupon participation costs during the Phase C period?
- What effects have Phase C design changes had on retailers' EBT participation costs?

Retailers' participation costs in the Food Stamp Program are defined to include the following eight components:

- any increment in checkout time for food stamp purchases relative to cash transactions;
- handling, depositing, and reconciling of food stamp benefits;
- training employees on food stamp procedures;
- reshelving items returned or brought to the checkout counter but not purchased, either because the EBT transaction could not be authorized or the client had an insufficient number of food stamp coupons;
- float, or the interest foregone because of a delay between a food stamp purchase and the availability of funds to the retailer;
- EBT monthly telephone charges that are assumed by the retailer;
- losses due to accounting errors; and
- space consumed by EBT terminals.

Earlier measures of retailer participation costs revealed EBT participation costs to be roughly one-third lower than coupon costs.¹ Given the similarity in how stores process EBT transactions in the redesigned and original EBT systems, the same general result was expected in the current analysis. Likewise, EBT participation cost levels were not expected to vary greatly between the original and redesigned systems.

RESEARCH STRATEGY

This section outlines the methodology employed to analyze the research questions presented above.

Data Sources. Data on retailer perceptions come from interviews with 114 of the 129 store owners and managers participating in the extended EBT demonstration. These in-person interviews were conducted between April 6 and June 21, 1988. During the interviews, retailers were asked to comment on a wide variety of subjects related to the EBT system, and to assess the frequency and severity of a number of different system problems. These interviews also provide most of the information on retailers' participation costs under the coupon and EBT systems. Retailers were asked to estimate their costs for seven of the eight components described above. Both EBT and coupon costs were discussed during the same interview.²

Estimated impacts on checkout productivity are the only cost component not based on retailer interview responses. The EBT system's impact on checkout productivity is estimated using data collected during observations at 30 Reading food stores. Observers with stopwatches recorded the duration and characteristics of EBT and non-food stamp purchases (e.g., cash, personal check, etc.) on two days at each store (for a total of 60 observation days). Coupon transactions were observed and recorded using an identical process on two days at ten stores in Allentown, Pennsylvania.³ Regression techniques

¹William L. Hamilton, et al., op. cit., p. 165.

²Retailers in Reading continued to accept food stamp coupons throughout the demonstration, albeit at a reduced rate following implementation of the EBT system.

³Allentown was chosen as the comparison site because it is the closest comparably sized city to Reading with a substantial number and variety of stores where food stamp coupon transactions were likely to be observed.

described later in the chapter were used to estimate the incremental time for EBT and coupon transactions over that for cash purchases.

The analysis is also supported by six waves of interviews with 30 participating retailers in Reading conducted periodically between October 1986 and December 1988. These interviews were performed primarily to monitor system operations, but they also provide information on how retailer perceptions on various aspects of system operations changed during the Phase B and Phase C periods. The results of these interviews are summarized in Appendix VC.

Research Approach. Retailer impacts are analyzed for stores within a given store type and for the combined sample of all stores. The store type analyses were based on FNS' standard categories. Store types representing stores with similar characteristics were then combined into four general classifications: supermarkets; grocery stores (which include small/medium grocery stores and specialty food stores); convenience stores (which include convenience stores and convenience/gas stores); and all "other stores," which include produce stands, health food stores, milk routes and other store types.¹

Retailer participation costs are presented in terms of the cost incurred per \$1,000 of food stamp benefits redeemed. The average monthly cost per store is also presented to provide a perspective on the absolute cost typically incurred. Cost per case month, the main measure used in other chapters, is not a natural measure of retailer activity, because recipients do not necessarily spend their whole monthly allotment in a single store.

One important consequence of standardizing costs in terms of the volume of food stamp benefits redeemed is the possible distortion introduced by the relatively low volume of coupons redeemed during the EBT demonstration. This distortion particularly applies to cost components whose magnitudes do not vary directly with benefit redemption levels (e.g., employee training costs). For these components, the analysis is broadened to include

¹A full listing of store types comprising "other stores" is provided in Appendix VA.

previously measured data to provide a more accurate comparison of EBT and coupon costs.

HIGHLIGHTS

Average retailer food stamp participation costs are lower with the EBT system than with food stamp coupons. Estimated costs are \$17.28 per \$1,000 of benefits redeemed in the EBT system, compared with \$23.88 per \$1,000 of coupon redemptions. Handling and reconciliation activities are the main source of the EBT system savings. Monthly float costs also are lower with the EBT system than with food stamp coupons. EBT participation costs slightly exceed coupon costs for checkout, training costs, accounting errors, and unreimbursed telephone charges. Larger cost disadvantages for the EBT system are found in the areas of reshelving costs and space costs.

Estimated EBT participation costs per \$1,000 of benefits redeemed

are \$3.80 greater during Phase C than during the original EBT demonstration. Estimated coupon costs also are greater during Phase C, averaging \$6.14 more per \$1,000 redeemed than during the original demonstration. Higher handling and reconciliation costs for both the EBT and coupon systems contribute most to the difference in total estimated costs between the original demonstration and Phase C periods.

Retailers do not perceive that implementing the Phase C EBT system has caused significant impacts on store operating costs, total monthly sales, profitability, or food stamp customer complaints. A slight downward effect is perceived in monthly food stamp sales, with all store types sharing this perception.

The Phase C EBT system enjoys the support of a substantial majority of participating retailers. When asked which food stamp redemption system they prefer -- the Phase C EBT system, the Phase B EBT system, the original EBT system, or the food stamp coupon system -- approximately 70 percent of retailers indicate the Phase C EBT system. Seventy-five percent of retailers prefer some electronic system to the paper coupon system. Given the strength of this measure, the EBT system will likely continue to enjoy the support of

5.1 RETAILER OPINIONS AND PREFERENCES

RETAILERS' PERCEPTIONS OF SYSTEM PROBLEMS

During interviews with participating retailers, interviewers read a list of 18 problems which could arise during EBT system operations. For each problem, the retailer was asked whether he or she considered the problem "serious," "minor," or "not a problem at all."

Responses to these questions indicate that retailers do not believe the EBT system had many "serious" problems. Exhibit 5-1 presents the six EBT system problems retailers most frequently considered serious. As shown in that exhibit, periods of system inaccessibility (due to telephone or computer breakdown) are considered a serious problem by slightly over one-fifth (23 percent) of all respondents. In-store printer failure is considered a serious problem by 14 percent of all retailers. Recipients delaying checkout lines while checking their account balance, damaged recipient cards that cannot be read by the card reader, and difficulties reconciling EBT sales with bank deposits are each considered serious problems by around 10-11 percent of the respondents. Over three-quarters (78 percent) of respondents reported two or fewer problems as being serious.

Retailers tend to perceive situations which disrupt or delay EBT transactions as the most serious problems. The five most serious problems all describe non-routine situations in which EBT transactions either cannot be processed or the transaction process is delayed. This result differs slightly from the previous evaluation of the EBT system. At that time retailers considered normal system aspects (e.g., reconciliation and the 2:00 p.m. deposit cutoff) as more serious than transaction-related problems. This apparent shift toward transaction-related problems cannot be explained by an increase in the frequency and severity of system disruptions during Phase C. As explained later in this section, retailers actually perceived an improvement in system accessibility during Phase C. A more likely explanation of retailers' current emphasis on transaction-related problems may be that the EBT system has become absorbed into routine store operations, and retailers have adjusted to system features which were previously considered problems.

This view is also supported by the problems which retailers least frequently considered serious. Of the five problems considered serious by the

Exhibit 5-1

IBT System Problems Most Frequently Considered Serious^a

Problem	MAJOR STORE TYPE				All Stores
	Super-markets	Grocery Stores	Convenience Stores	Other Stores	
The telephone lines or the system computers are down, and no automatic transactions can be processed.	9 (39.1%)	11 (20.0%)	3 (14.3%)	3 (20.0%)	26 (22.8%)
Problems occur with the in-store printer(s).	6 (26.1)	7 (12.7)	2 (10.0)	1 (6.7)	16 (14.2)
Recipients forget how much is in their food stamp account, so transactions are rejected for insufficient balance.	5 (21.7)	4 (7.3)	2 (9.5)	2 (13.3)	13 (11.4)
Recipients slow down the checkout process by making balance inquiries from the counter.	4 (17.4)	4 (7.3)	1 (4.8)	4 (26.7)	13 (11.4)
The customer has a bad or damaged card, and the BTT cannot read it at all.	1 (4.3)	7 (12.7)	3 (14.3)	1 (7.1)	12 (10.6)
Deposit information is hard to reconcile with store records.	6 (30.0)	3 (5.7)	0 (0.0)	2 (15.4)	11 (9.8)

Note: ^aNumber and percentage of retailers in each store type considering each problem to be serious.

Source: Phase C Retailer interview data.

smallest number of retailers, three are not related to transaction processing (i.e., deposits for EBT purchases are not credited as fast as they are supposed to be; deposits are made for the wrong account; and information on the amount of deposits comes too slowly). The other two problems seldom considered serious are recipients forgetting their PINs and stores' existing telephone lines being used to handle EBT transactions.

Supermarkets tend to view system problems more seriously than other stores. For five of the six problems listed in Exhibit 5-1, a greater percentage of supermarket retailers than retailers from other store types viewed the problem as a serious one. Supermarket retailers are likely to be especially sensitive to store disruptions or delays caused by the EBT system, given the larger volume of business potentially affected.

During the interview, retailers were asked whether they believed each of the 18 problems had improved, worsened or stayed about the same under the redesigned system, relative to the Phase B system.¹ Very few retailers believed any problems had worsened, and the majority felt problems had stayed about the same. Retailers tended to perceive the most improvement in areas related to system performance (e.g., system response time, system accessibility, and ability to connect with EBT system computers on the first attempt).

The perception of improvement in system accessibility is not totally consistent with the occurrence of major system problems during Phase B and Phase C. As shown in Exhibit 5-2, system problems of comparable severity occurred during both periods. Most of these problems reflect periods of system inaccessibility, due either to telephone line problems or to problems with system hardware or system files.

Retailer perceptions of improvements in system accessibility during Phase C may be influenced by efforts to minimize the impact of system disruptions. In some cases when the downtime was planned (such as on May 21, 1988), retailers were notified in advance by letter to minimize the downtime's

¹For purposes of distinguishing among EBT systems, interviewers referred to the Phase C system as the "redesigned" system, the Phase B system as the "transition" system and the PRC-designed system as the "original" system.

Exhibit 5-2

**Major System Problems during
the Extended EBT Demonstration**

Date	Event
<u>Phase B</u>	
July 11, 1986	Duplicate issuance posted to accounts of 44 recipients.
July 19, 1986	System inaccessible for 135 minutes due to telephone line problems.
July 20, 1986	System inaccessible for 206 minutes due to telephone line problems.
July 22-23, 1986	Posting of supplemental issuance delayed.
August 5-6, 1986	System down for 540 minutes when History File reached capacity.
October 6, 1986	Posting of regular monthly issuance delayed.
December 11-12, 1986	System down for 160 minutes to enlarge system's Master File; done at night to reduce impact on system users.
February 11-12, 1987	System down for 145 minutes to reorganize Master File; done at night to reduce impact on system users.
March 3, 1987	System down for 90 minutes to replace failed component.
April 16-17, 1987	System down for 125 minutes to reorganize Master File; done at night to reduce impact on system users.
May 9, 1987	System inaccessible for four to six hours due to telephone line problems.
June 21-22, 1987	System down for 735 minutes for conversion to Phase C system; done at night to reduce impact on system users.

Note: Problems that occurred during times of normally heavy system usage are shown in boldface type.

Exhibit 5-2
(continued)

Date	Event
<u>Phase C</u>	
September 1987	Some reversed transactions not identified by retailers; BCAO called in affected recipients to deduct benefits from accounts.
October 13-14, 1987	System inaccessible for 327 minutes due to telephone line problems.
November 6, 1987	System inaccessible for 190 minutes due to telephone line problems.
December 8-9, 1987	System down for 347 minutes to upgrade equipment; done at night to reduce impact on system users.
January 17, 1988	System down for 675 minutes due to power outage at computer center.
March 8, 1988	System down for 26 minutes due to CPU failure.
May 21, 1988	System down for 1,116 minutes to allow construction at the computer center.
June 22, 1988	System down for 87 minutes during prime hours due to generator failure.
October 29, 1988	System down for 882 minutes for planned work on generators.
December 3, 1988	System down for 188 minutes because of switching component failure due to power loss.
December 7, 1988	System down for 9 minutes because of an external line failure.

Note: Problems that occurred during times of normally heavy system usage are shown in boldface type.

impact on store operations. Some downtime episodes were scheduled during periods of light demand to further reduce the impact on system users.

Retailer perceptions of downtime frequency were measured periodically as part of the monitoring surveys described in Section 5.1. When asked whether they had noticed periods of system inaccessibility during the previous several months, retailers more frequently answered affirmatively during Phase B interviews than during Phase C interviews. These data, however, are subject to certain limitations; a more thorough discussion of periodic survey results is presented in Appendix VC.

In addition to the major problem incidents outlined in Exhibit 5-2, an average of about 200 transaction reversals occurred each month during Phase C. As mentioned in Chapter 4, a transaction reversal occurs when the EBT system cannot complete transaction processing. When a transaction is reversed, the retailer's account is not credited and the recipient's account is not debited. If the transaction reversal is noticed by the cashier, the transaction can simply be re-initiated. If the reversal is not noticed until after the recipient has left with the groceries, however, the recipient must return to the store or go to the welfare office to reprocess the transaction.

RETAILERS' SYSTEM PREFERENCE

To further gauge retailer satisfaction, retailers were asked which system of handling food stamp purchases they preferred: the Phase C EBT system, the Phase B EBT system, the original EBT system, any electronic system, food stamp coupons, or no preference. Exhibit 5-3 presents the response frequencies to this question.

As shown in the exhibit, retailer preference for the Phase C EBT system ranges from 53 percent of "other store" respondents to 80 percent of convenience store respondents. Overall, 70 percent of retailers preferred the redesigned Phase C EBT system to all other alternatives. Seventy-five percent preferred some electronic system to food stamp coupons.

Retailers who prefer an EBT system generally believe that the system is faster, easier, and more efficient. These retailers also believe that an EBT system is more accurate, that it reduces the likelihood of program fraud, and that it reduces onerous handling tasks such as counting food stamp coupons.

Exhibit 5-3

Food Stamp System Preference

	MAJOR STORE TYPE				All Stores
	Supermarkets	Grocery Stores	Convenience Stores	Other Stores	
Phase C EBT System	16 (72.7%)	37 (69.8%)	16 (80.0%)	8 (53.3%)	77 (70.0%)
Phase B EBT System	0 (0.0)	1 (1.9)	0 (0.0)	0 (0.0)	1 (0.9)
Original EBT System	1 (4.5)	1 (1.9)	0 (0.0)	0 (0.0)	2 (1.8)
Any Electronic System	0 (0.0)	0 (0.0)	2 (10.0)	1 (6.7)	3 (2.7)
Food Stamp Coupons	2 (9.1)	8 (15.1)	0 (0.0)	5 (33.3)	15 (13.6)
No Preference	3 <u>(13.6)</u>	6 <u>(11.3)</u>	2 <u>(10.0)</u>	1 <u>(6.7)</u>	12 <u>(10.9)</u>
Total	22	53	20	15	110

Source: Phase C retailer interview data.

Although the redesigned EBT system wins the majority of responses across all store types, food stamp coupons are preferred by about 14 percent of all respondents, particularly those in the "other store" category (33 percent). These respondents most frequently consider coupons faster to transact and without the risk of system failure, and they regard coupon deposits as being easier to reconcile than EBT transactions.

Retailers who prefer the coupon system also tend to regard system problems as more serious than those who prefer an electronic system. Among the 18 system problems discussed during the interviews, an average of 3.5 system problems were considered serious by retailers who prefer the coupon system. Retailers preferring an electronic system characterized an average of only 1.1 system problems as serious.

PERCEIVED SYSTEM IMPACTS ON STORE OPERATIONS

Retailers were asked to compare the impact of the Phase C EBT system relative to the Phase B system on five areas of store operations: checkout counter productivity, total monthly sales, monthly food stamp sales, store operating costs, and store profitability.¹ Exhibit 5-4 presents retailers' perceptions of the impacts of the Phase C system on store operations.

For each area of operations, a large majority of retailers do not perceive any system-caused effects. Over one-quarter of the retailers, however, perceive the redesigned system contributing to some improvement in checkout counter productivity -- a result consistent with one goal of the redesigned EBT system. Lesser numbers of retailers attributed improvements in total monthly sales (9 percent), store profitability (7 percent) and operating costs (3 percent) to the redesigned system.

In contrast to these generally viewed benefits of the Phase C system, more retailers (19 percent) say the Phase C system contributed to lower total food stamp sales (EBT and coupon) than higher food stamp sales (3 percent), and this pattern held within each store type. Although this

¹Retailers indicating impacts (positive or negative) were further asked to attribute all or part of the change to the redesigned EBT system. By combining these measures, we are able to determine how retailers perceive the impact of the redesigned system on store operations.

Exhibit 5-4

**Retailer Perceptions of System Impacts
on Store Operations**

	Some improvement due to Phase C EBT System	No EBT- caused Changes ^a	Some decline due to Phase C EBT System
Checkout Productivity	24 (26.1%)	66 (71.7)	2 (2.2)
Monthly Food Stamp Sales	3 (3.4)	68 (77.3)	17 (19.3)
Total Monthly Sales	8 (9.1)	79 (89.8)	1 (1.1)
Operating Costs	2 (2.6)	73 (96.1)	1 (1.3)
Store Profitability	6 (7.3)	76 (92.7)	0 (0.0)

Note: ^aIndicates retailers either perceiving no change in the measure or perceiving a change but not attributing the change to the Phase C system.

Source: Phase C retailer interview data.

perception would be supported if food stamp issuances had declined in the demonstration area, total food stamp issuances actually increased following implementation of the Phase C system. During the 12-month period prior to Phase C implementation (June 1986-June 1987), Berks County's monthly food stamp issuances averaged roughly \$613,500. During the 12-month period between Phase C implementation and retailer data collection (June 1987-June 1988), food stamp issuances increased by nearly 5 percent, to about \$643,000.¹

Another possible explanation for the perceived negative impact of the Phase C system on food stamp sales is that food stamp sales have shifted from one store type to another. (An early concern of food retailers was that an EBT system might negatively impact independent operators and shift food stamp sales to larger supermarkets, and a greater percentage of convenience stores and "other stores" than supermarkets or grocery stores did say that the Phase C EBT system had caused a drop in sales.) To test this hypothesis, we compared each sample store's average monthly food stamp sales redemptions (EBT and coupon) during October 1986-March 1987 with the same average computed during October 1987-March 1988. No clear patterns emerged from this comparison; nearly as many stores in each store type experienced a net increase in average monthly food stamp sales as the number who experienced a net decline. The overall sample experienced an increase in food stamp sales of 1.9 percent between the two 6-month periods. Within the sample, supermarkets' food stamp sales increased 1.8 percent, grocery stores' monthly sales increased 1.9 percent, convenience stores' sales decreased 2.2 percent, and other stores' sales increased 18.8 percent (relative to a small initial volume of food stamp sales).² Thus, the correlation between perceptions of changes in sales and actual redemptions is low.

Finally, it is possible that a decline in the number of food stamp coupon sales may explain the perceived decline in overall food stamp sales. In January-March 1988 (shortly before retailer data collection), BCAA added about 700 food stamp households to the EBT system. Because these households

¹Food Stamp Statistics (June 1986 - June 1988), Department of Public Welfare, Commonwealth of Pennsylvania.

²FNS Monthly Redemption Reports (October 1986-March 1987, October 1987-March 1988).

had been previously using food stamp coupons, retailers may have noticed a (proportionately large) decline in food stamp coupon sales without recognizing the smaller increase in EBT activity.¹

5.2 EBT SYSTEM EFFECTS ON CHECKOUT COSTS

Cash is the most common payment method at retail food stores and is generally regarded as the quickest to transact. Because of this advantage in transaction speed, the time to handle cash purchases often serves as the benchmark for assessing transaction times of other payment methods, including the EBT system. Because the EBT system replaces paper food stamp coupons, however, the more useful comparison of transaction times is between these two food stamp payment methods. Such a comparison provides the main focus of the analysis of EBT system effects on checkout costs.

Design changes introduced with the Phase C EBT system were intended to improve system processing speed and system reliability. In light of these changes, the average time and cost to process an EBT purchase would be expected to decrease.

PURCHASING FOOD WITH FOOD STAMP BENEFITS

Buying food with food stamp coupons has obvious differences from an EBT purchase, but also many important similarities. The most important similarity concerns program regulations restricting the use of food stamp benefits to the purchase of program-authorized food products. Because of this restriction, a recipient wanting to purchase both food stamp and non-food stamp items must tender two forms of payment, where only one would be needed for a non-food stamp customer.

Food Stamp Coupon Purchases. Recipients using food stamp coupons present them to the cashier when purchasing authorized items. Food stamp coupons are issued in \$1, \$5, and \$10 denominations. Only \$1 coupons may be loose (i.e., out of a booklet) at the time of a purchase; loose \$5 and \$10

¹The shift of 700 households to the EBT system reduced the number of food stamp households using coupons by about 41 percent, while increasing the number of EBT system users by 20 percent.

coupons may be used only if the recipient produces the booklet with matching serial numbers. Any change over \$0.99 must be given in loose \$1 coupons.

Cashiers may also require that food stamp customers produce a program identification card to establish the customer's authorization to use the coupons.

EBT Purchases. Processing food stamp transactions through the EBT system was discussed in detail in Chapter 2. This section briefly reviews the steps of an EBT purchase transaction.

Each EBT participant carries a Benefit Identification Card (BIC), which is a plastic card with the recipient's photograph on one side and an encoded magnetic stripe on the other. The participant presents the card to the clerk who swipes the card through the card reader on the Benefit Transaction Terminal (BTT).

The participant then enters a four-digit Personal Identification Number (PIN) on a PIN pad attached to the terminal and, if the entry agrees with the PIN information encoded on the card, the clerk is prompted to continue the transaction.

The clerk selects the "Purchase" key and enters the amount on the BTT. The BTT transmits the information to the system's computer, where the participant's account balance is compared with the purchase amount. If sufficient benefits exist, the purchase is authorized and a receipt is printed listing the amount of the transaction and the client's remaining balance. If the client's balance is insufficient, the client can make up the difference with another form of payment, remove some items from the order, or stop the transaction. If the participant still wants to use food stamp benefits, the electronic transaction must be re-initiated.

METHODOLOGY

The analysis presented in this section is based on recorded observations of transactions at retail food stores. Trained observers stood at checkout counters and recorded the time each transaction began and ended; certain intermediate times (e.g., when payment began and ended); and characteristics of the transaction, such as the number of items, the payment method, and the occurrence of any unusual problems.

Observations were conducted between April and June, 1988, at 30 participating food retailers in Reading. Because the Reading stores see relatively few food stamp coupon recipients, comparison observations were conducted at 10 stores in Allentown, a city near Reading but without an EBT system.

Realizing that checkout procedures might vary systematically by store type, the Reading observations were conducted at 10 supermarkets, 10 grocery stores, and 10 convenience stores. The Allentown sample included 4 supermarkets, 3 grocery stores, and 3 convenience stores. "Other stores" were excluded from the checkout productivity analysis for two reasons. First, purchases at these stores often follow very unusual patterns. For example, purchases at farmers' markets include selection and weighing of produce. With these highly variable patterns for transacting the sale, a large sample of observations would be needed to estimate the effects of payment method on total transaction time. Second, although "other stores" represent about 15 percent of the total evaluation sample of retailers, these stores handle only about 2 percent of all EBT and coupon redemptions. Thus, a very large data collection effort would have been needed to observe enough EBT and coupon transactions to support the analysis.

Within a given store type, stores were sampled for checkout observations on the basis of their monthly food stamp redemption levels. That is, in both Reading and Allentown, stores handling the greatest volume of food stamp sales were selected for observation. This sampling approach reduces the generalizability of the analysis somewhat because stores were not randomly selected. The goal, however, was to achieve a sample of food stamp transactions (both EBT and coupon) which best represented all food stamp transactions. This goal was better obtained by observing the highest-volume stores than by observing a random sample of stores.

Following this same strategy, observations were concentrated on benefit issuance days and the two subsequent business days to maximize the number of observed food stamp purchases. The final analysis sample represents over 9,600 observed purchases, including about 450 EBT transactions and nearly 300 food stamp coupon transactions.¹

¹For more detail on the checkout observation data, see Appendix VB.

The analysis of the EBT system on checkout counter productivity is based on a regression of the observed data on two dependent variables:

- the total time of a transaction, from the start of the order through ringing, paying, and bagging, to the end of the order; and
- payment time, from the time the cashier determines the purchase amount or the customer indicates the payment method, to the time the customer receives the purchase receipt and any change.

The analysis of total transaction time forms the basis of the analysis of checkout costs presented later in this section. Payment time is analyzed because this portion of the total transaction is expected to be most affected by the introduction of an EBT system.

Because food stamp coupons or the EBT card are often used with one or more other payment methods, a food stamp benefit purchase is represented in the model by three indicator variables:

- EBT card (or food stamp coupons) only;
- EBT card (or food stamp coupons) in combination with cash; and
- EBT card (or food stamp coupons) in combination with any other form of payment.

The explanatory variables used in the regression models are listed in Exhibit 5-5. A more thorough discussion of the variables and the regression methodology is presented in Appendix VB.

In the previous analysis of the original EBT system's impacts on checkout productivity, separate estimates were provided for "routine" and "non-routine" EBT transactions. Routine transactions included those that (1) involved no problems with the EBT system, (2) did not involve any other unusual circumstances or events, (3) were not judged unduly "long" by the observer, and (4) did not have an average price per item of less than 10 cents. Because the EBT system had been operating for nearly four years at the time transactions were observed in 1988, any remaining system-related problems (e.g., reswiping a damaged client card) must be considered part of normal system operations. Thus, the current analysis does not distinguish between routine and non-routine transactions in the estimation of productivity

Exhibit 5-5

Explanatory Variables in the Regression Analysis

Forms of Payment (and Combinations of These)

Constant (represents payment in cash)
EBT card only
EBT card and cash (but no other forms of payment)
All other combinations of payment forms that include the EBT card
Food stamp coupons only
Food stamp coupons and cash (but no other forms of payment)
All other combinations of payment forms that include food stamp coupons
Check
Other coupons only
Other form of payment

Variables Involving the Number of Items

Number of items
Number of items, when only cashier does bagging
Number of items, when no bagging takes place

Events During Ringing

Price checks (indicator variable)
Produce weighing (indicator variable)

Other Variables (all indicators)

Presence of a problem with EBT system
Other nonroutine circumstances or events
"Long" transaction (observer noted unusually long transaction,
but no problem)
"Penny candy" transaction (average price per item less than 10 cents)

impacts. It does, however, present information on the frequency of EBT-related problems.

REGRESSION RESULTS

Exhibits 5-6 and 5-7 present the estimated coefficients from the regression models on total transaction time and payment time. Three separate models (one for each store type) are presented in each exhibit. Within each model, the regression coefficient for an explanatory variable indicates the average amount of time that the dependent variable (i.e., total time or payment time) changes in response to a unit change in the explanatory variable, in the presence of the other explanatory variables. The explanatory variables for the various payment forms (e.g., EBT card only or food stamp coupons only) are indicator variables -- that is, mutually exclusive dummy variables indicating the presence or absence of the payment form in the transaction. Payment by cash only is the only payment form not included as an explanatory variable; the contribution of cash only payments is included in the constant term.

As a result of this specification, the corresponding coefficient for a payment method tells how much that method typically adds to the dependent variable when present, relative to cash. The coefficients for non-payment variables have the same interpretation. For example, the coefficient for number of items identifies the incremental time each additional item adds to the dependent variable.

As indicated by the R^2 values in the six regression models, the regression analysis explains more of the variation in total transaction times than in payment times. Similarly, the regression models for convenience stores explain less variation than the models for supermarkets and grocery stores. This pattern of explanatory value is similar to that found in the analysis of checkout observation data from the original demonstration period. One explanation for the differences in R^2 across models is differences in the amount of variation to be explained. As indicated by the

Exhibit 5-6

Regression Model For Total Time
(in Seconds) per Transaction:
Each Store Type

Explanatory Variable	Supermarkets	Grocery Stores	Convenience Stores
Constant	21.5 **	23.8 **	19.5 **
EBT card only	26.5 **	38.9 **	47.8 **
EBT card and cash	30.3 **	40.1 **	59.9 **
EBT card, other combinations	106.6 **	---	---
Food Stamp (FS) coupons only	33.8 **	44.7 **	28.7 **
FS coupons and cash	40.8 **	92.2 **	---
FS coupons, other combinations	87.8 **	---	---
Check only	44.2 **	38.4 **	31.9 **
Other coupons only	34.7 **	53.7 **	-0.81
Other payment method	35.3 **	21.1 *	25.7 *
Number of items	3.63 **	4.64 **	1.92 **
Items, only cashier bagging	0.79 **	0.43	0.47
Items, no bagging	-1.09 **	-2.64 **	-0.70
Price checks	41.2 **	28.5 *	3.3
Produce weighing	20.4 **	21.5 **	55.7 **
EBT-related problem	63.0 **	128.9 **	34.2 **
Other problem	29.2 **	25.2 **	30.8 **
Extra long transaction	62.9 **	38.0 **	98.0 **
Candy purchase	-8.4	-52.7 **	-37.6 **
R ²	0.78	0.62	0.35
Mean of dependent variable	115.9	61.2	28.8
Standard deviation of dependent variable	121.3	87.3	35.1
Number of transactions	3,450	2,782	3,386

Statistical Significance: +, P < 0.10; *, P < 0.05; **, P < 0.01.

Note: Model specification dropped explanatory variables when no transactions exhibiting that characteristic were observed in the sample.

Source: Phase C observation data.

Exhibit 5-7

**Regression Model For Payment Time
(in Seconds) per Transaction:
Each Store Type**

Explanatory Variable	Supermarkets	Grocery Stores	Convenience Stores
Constant	15.1 **	12.7 **	8.3 **
EBT card only	34.5 **	39.1 **	36.9 **
EBT card and cash	51.1 **	37.6 **	33.5 **
EBT card, other combinations	60.7 **	---	---
Food Stamp (FS) coupons only	25.7 **	11.1 **	11.3 **
FS coupons and cash	40.5 **	20.0 **	---
FS coupons, other combinations	35.9 **	---	---
Check only	37.5 **	30.9 **	15.0 **
Other coupons only	8.4 **	12.8 **	-2.2
Other payment method	8.8	6.8 *	10.7 +
Number of items	0.34 **	0.32 **	0.48 **
EBT-related problem	14.3 +	57.4 **	39.7 **
Other problem	14.1 **	0.7	7.8 **
Extra long transaction	19.9 **	15.2 **	16.3 **
Candy purchase	-5.6	-3.5	-10.0 **
R ²	0.35	0.35	0.22
Mean of dependent variable	29.4	19.0	11.4
Standard deviation of dependent variable	32.9	27.9	17.8
Number of transactions	3,450	2,782	3,386

Statistical Significance: +, P < 0.10; *, P < 0.05; **, P < 0.01.

Note: Model specification dropped explanatory variables when no transactions exhibiting that characteristic were observed in the sample.

Source: Phase C observation data.

regression models tend to have higher R^2 values when the dependent variable exhibits greater variation.

Another reason for the lower explanatory power of the payment time models is that payment time is harder to define in a consistent manner across transactions than total transaction time. An example best serves to illustrate the problem. When an EBT card is used to pay for part or all of the purchase, the first step in the payment process is to swipe the card through the terminal's card reader and to enter the PIN on the attached PIN pad. This action is initiated by the recipient, however, and it may occur either while groceries are being rung up or after the purchase has been totalled. In cash and food stamp coupon transactions, the analogous situation is when the customer begins counting cash or coupons. This counting may begin before or after the total purchase amount is known. With this inherent variation in the timing of the start of the payment step, it becomes more difficult to explain total variation in payment time.

The explanatory variables of most interest in Exhibits 5-6 and 5-7 are those identifying payment method and the variable indicating the presence of an EBT-related problem. Exhibit 5-8 summarizes the estimated coefficients for these variables.

The first major point to be made about the figures in Exhibit 5-8 is that, compared to both cash and food stamp coupons, using an EBT card increases payment time. This result was expected because payment time for EBT transactions includes time spent waiting for the system to authorize the purchase and print the EBT receipt. Compared to food stamp coupon purchases, the additional time caused by use of the EBT card varies from 8.8 to 28.0 seconds, depending upon store type and whether cash or other payment methods also were included.

We do not know exactly why the estimated EBT and coupon coefficients vary across store types. There is no reason to believe that the EBT system took more or less time to process transactions from one store type than another, nor are there any strong hypotheses as to why coupon payment times would vary systematically across store types. The variation might be due to differences in bagging procedures (i.e., supermarkets may be more likely to bag groceries before presenting the customer with the sales or EBT receipt, thereby increasing payment time), to the demographics of customers (i.e., if

Exhibit 5-8

Time Increments of EBT Card and Coupon Transactions (Relative to Cash Transactions), Increments in Seconds per Transaction

Total Time	MAJOR STORE TYPE		
	Super-markets	Grocery Stores	Convenience Stores
EBT Only	26.5**	38.9**	47.8**
Food Stamp Coupons Only	<u>33.8**</u>	<u>44.7**</u>	<u>28.7**</u>
Difference	-7.3	-5.8	19.1**
EBT and Cash	30.3**	40.1**	59.9*
Food Stamp Coupons and Cash	<u>40.8**</u>	<u>92.2**</u>	---
Difference	-10.5	-52.1	---
EBT and Other	106.6**	---	---
Food Stamp Coupons and Other	<u>87.8**</u>	---	---
Difference	18.8	---	---
EBT-related Problem	63.0**	128.9**	34.2**

Payment Time			
EBT Only	34.5**	39.1**	36.9**
FS Coupons Only	<u>25.7**</u>	<u>11.1**</u>	<u>11.3**</u>
Difference	8.8 +	28.0**	25.6**
EBT and Cash	51.1**	37.6**	33.5**
FS Coupons and Cash	<u>40.5**</u>	<u>20.0**</u>	---
Difference	10.6	17.6**	---
EBT and Other	60.7**	---	---
Food Stamp Coupons and Other	<u>35.9**</u>	---	---
Difference	24.8**	---	---
EBT-related Problem	14.3+	57.4**	39.7**

Statistical Significance: +, P < 0.10; *, P < 0.05; **, P < .01.

Source: Exhibits 5-6 and 5-7.

elderly customers take longer counting coupons or entering their PIN and if they tend to shop at supermarkets, then payment times at supermarkets would be longer), or to other systematic factors. The major purpose in analyzing payment and total transaction times separately for each store type, however, was to allow the effects of any systematic (but unknown) differences in procedures or other factors to be captured in the analysis.

The second major point to be made about the coefficients in Exhibit 5-8 is that total transaction times also increase when either the EBT card or food stamp coupons are used, and that the incremental effect varies by store type. In general, the added time is greater for grocery store purchases than for supermarket purchases, and greater still for convenience store purchases. The one exception to this pattern is the relatively small coefficient (28.7 seconds) for coupon-only purchases at convenience stores.

As with variations in payment time across store type, there is no ready explanation for the general pattern of variation (or the convenience store exception) in total payment times. The one major difference across store types is the size of the purchase, but the effect of purchase size is captured in the regression models with the "number of items" variable. The estimated coefficients do indicate, however, that the effects on total transaction times of using the EBT card or food stamp coupons do vary by store type, even though the reasons for the differences remain unclear.

Finally, a last point to be made about the coefficients in Exhibit 5-8 is that, by themselves, they cannot give a clear picture of the overall effect of EBT or coupon use on checkout productivity. The overall effect will be influenced not only by the individual coefficients, but by the relative frequency of different payment combinations and EBT-related problems. After a discussion of the relative frequency and impact of EBT-related problems, the section estimates the overall impact of different payment methods on retailers' checkout costs.

PROBLEM TRANSACTIONS

As shown by the estimated coefficients for the "EBT-related problem" variable in Exhibit 5-8, total transaction times increased by an average of 34 seconds (in convenience stores) to 129 seconds (in grocery stores) when a problem was encountered during an EBT purchase. Payment times increased by 14

to 57 seconds.

EBT problems may be related to either system malfunctions, incorrect store procedures, or recipient mistakes. System malfunctions include misuse or damage to EBT store equipment, multiple attempts to read a damaged card (by reswiping the card through the card reader), slow system response (generally due to heavy demand), and total system inaccessibility. Problems of incorrect store procedures generally include store personnel not knowing how to operate EBT store equipment. These latter problems also include having to sign-on store terminals with the store card, refilling printer paper, and errors when entering the purchase amount into the EBT terminal.

Recipients can also delay EBT transactions. Recipients may attempt to make a purchase with an insufficient balance, or they may delay the process by checking their balance during the transaction. Recipients may also delay the transaction by incorrectly entering their PIN or by asking cashier assistance when unsure of how to correctly process an EBT transaction.

Average Frequency of Problem Transactions. The frequency of observed EBT-related problems is presented in Exhibit 5-9, along with comparable data collected during the original system demonstration. As shown in that exhibit, problems were observed for a smaller portion of EBT transactions with the redesigned system (8.3 percent) than with the original system (16.0 percent). Moreover, relative problem frequency declined in all three major problem categories.

Recipient problems, particularly incorrect PIN entry, were the most commonly observed Phase C EBT problem (occurring in 5.7 percent of all EBT transactions). Recipient problems were also most frequent during the original demonstration, when they were observed in 8.0 percent of all EBT transactions. System-related problems, such as card reswipe or slow system response, occurred in 3.7 percent of the observed Phase C EBT transactions; down from 4.9 percent of original system transactions. Problems with store procedures declined from 4.9 percent of EBT transactions during the original demonstration to 2.5 percent of the redesigned EBT system transactions.

Average Delays with Problem Transactions. To estimate the impact of individual problems on EBT transactions, the general regression model (without the EBT-problem indicator) was applied to the 409 problem-free EBT transac-

Exhibit 5-9

Frequency and Estimated Delay
for Problems Observed in EBT Transactions^a

Problem	Frequency		Mean Delay (in Seconds)	
	Original System	Phase C System	Original System	Phase C System
<u>System/Equipment/Card</u>	<u>4.9%</u>	<u>3.7%</u> ^b	<u>69.1</u>	<u>60.0</u>
-equipment or system down	0.6	0.1	6.7	275.6
-reswipe	4.3	3.6	78.0	85.6
-slowdown	0.0	0.9	---	-169.4 ^c
-receipt problem	0.0	0.0	---	---
<u>Store Procedures</u>	<u>4.9%</u> ^b	<u>2.5%</u>	<u>9.3</u>	<u>149.7</u>
-sign-on (BTT off)	3.1	0.1	-91.8 ^c	-36.7 ^c
-refill paper	0.0	0.0	---	---
-confusion	1.9	1.1	177.8	72.7
-entry error on BTT	0.0	0.6	---	529.7
-next customer taken	0.0	0.7	---	46.4
<u>Recipient Procedures</u>	<u>8.0%</u>	<u>5.7%</u> ^b	<u>67.1</u>	<u>39.6</u>
-insufficient balance	3.1	1.7	118.1	21.2
-balance check	1.2	1.1	148.2	-318.2 ^c
-PIN	3.7	3.8	-2.6 ^c	116.6
-discussion	0.0	0.0	---	---
-alternate shopper card	0.0	0.0	---	---
<u>Total</u>	<u>16.0%</u>	<u>8.3%</u>	<u>51.7</u>	<u>69.2</u>
Total # of problem EBT transactions	29	35		
Total # of EBT transactions	162	444		
Total # of all transactions	5,069	9,618		

Notes: ^aWeighted to reflect the distribution of total transactions among store types.

^bTotals may not add because a transaction may experience more than one problem.

^cNegative values occur if the actual transaction time is shorter than the time predicted on the basis of other characteristics of the transaction.

Source: Phase C and Late (original) Demonstration observation data. See Appendix VB for procedure used in estimating delay times.

tions. The estimated coefficients from this model were then used to predict total transaction times for the 35 problem transactions. Average delays arising from specific problems were then calculated by subtracting predicted times from actual total transaction times.

The mean estimated delays for each type of problem are presented in Exhibit 5-9. The estimates for specific types of problems must be treated with caution because of the small number of observations (35 problem transactions among Phase C data and 29 among original system data). Negative values also occur because the analysis technique compares the actual transaction with a "problem-less" prediction. Negative values should be interpreted as the predicted value being less than the observed value, not that the problem reduced the transaction time.

The average impact of an EBT problem during the latter stages of the original demonstration was a delay of roughly 52 seconds. In contrast, delays in the extended demonstration averaged about 69 seconds. The increase is primarily due to delays caused by problems with store procedures. During the original demonstration, problems with stores' EBT procedures added about 9 seconds to the transactions in which they occurred. During the extended demonstration, these problems added an average of 150 seconds to total transaction time. Most of this impact occurred in transactions in which the clerk erred when entering the purchase amount on the EBT terminal. In such a situation a refund or an additional purchase transaction was required to correct the error. If a refund was required, the store's EBT card and PIN would have been needed to initiate the transaction.

Problems with EBT equipment had similar impacts on total transaction times during the original demonstration and Phase C periods. Problems with the original system added about 69 seconds to total transaction time, whereas problems with the redesigned system added an average of 60 seconds.

Delays due to recipient problems declined between the original demonstration and Phase C, falling from an average of 67 seconds to an average of about 40 seconds.

The overall impact of EBT problems on checkout productivity is a function of both the average delay caused by a problem and the frequency of occurrence. As noted, the frequency of EBT-related problems was much lower

during Phase C than during the latter stages of the original demonstration. In the next section, the overall impact of EBT problems is included in the analysis of system effects on checkout productivity and costs.

ESTIMATED CHECKOUT COSTS

The incremental time of a food stamp purchase over a cash purchase imposes costs on retailers. Estimating these costs assumes an employee would be constructively engaged in other store activity during the incremental time spent processing food stamp transactions. The opportunity cost of using this employee as a cashier represents a cost to participate in the Food Stamp Program. Given this definition, EBT participation costs at checkout represent the value of the time difference between an average EBT purchase and an average cash purchase. Similarly, food stamp coupon participation cost is defined as the value of the time between an average food stamp coupon purchase and a cash purchase. This section presents estimates of these participation costs.

Average Time for a Typical Purchase. Earlier sections have focused on the incremental time difference between EBT, food stamp coupon, cash, and various combinations of payment methods. The frequency and impact of EBT problems also were discussed. By combining these factors we can construct a profile of a typical EBT purchase within each store type and use this profile to estimate the time required for a typical EBT transaction. Because purchases differ by factors other than payment method, we use the characteristics of the typical EBT purchase to estimate food stamp coupon and cash purchases as well. We therefore estimate the time impact of each of the different payment methods by restricting the other characteristics of the transaction to those displayed for the typical EBT purchase. This procedure is described more thoroughly in Appendix VB. Exhibit 5-10 presents the estimated total time for typical purchases using EBT, food stamp coupons, and cash as payment forms. The estimated times for EBT and coupon transactions include transactions in which the EBT card (or coupons) is used in conjunction with other payment forms, including cash.

Using the profile of a typical EBT purchase (including problem transactions), Exhibit 5-10 shows average total transaction time for EBT purchases by store type and for all stores. Largely because of differences in

Exhibit 5-10

Total Time (in Seconds) for Typical EBT Transactions
When Treated as EBT, Coupon, or Cash Transactions

	MAJOR STORE TYPE			All Stores ^a
	Supermarket	Grocery Store	Convenience Store	
EBT	262.81	104.41	86.84	222.77
Cash	<u>214.31</u>	<u>58.38</u>	<u>36.08</u>	<u>174.61</u>
Difference	48.49 **	46.03 **	50.76 **	48.16 **
Food Stamp (FS) Coupon	260.84	106.67	64.83	220.47
Cash	<u>214.31</u>	<u>58.38</u>	<u>36.08</u>	<u>174.61</u>
Difference	46.53 **	48.30 **	28.75 **	45.79 **
EBT-FS Coupon Difference	1.97	-2.26	22.01 **	2.37

Statistical Significance: +, $P < .10$; *, $P < .05$; **, $P < .01$.

Note: ^aTotal times for all stores are based on weighted averages of data specific to individual store types. The weights reflect the ratio of monthly food stamp sales to observed transactions. Differences in total times are computed. Significance of these differences is based on patterns displayed at the store type level and not on statistical testing.

Source: Phase C observation data.

the number of items processed, average transaction times for EBT purchases are greatest in supermarkets (263 seconds) and least in convenience stores (87 seconds). If cash had been used in these transactions instead of the EBT card, estimated total transaction times would be lower -- an average of 48 seconds lower when all store types are considered.¹ This difference is statistically significant at the 1-percent level.

This result is fairly consistent across store type, ranging only from 46 seconds (grocery stores) to 51 seconds (convenience stores). All differences at the store-type level are statistically significant.

If food stamp coupons are used instead of the EBT card, transaction times average about 46 seconds longer than comparable cash purchases. This difference is quite similar in supermarkets (47 seconds) and grocery stores (48 seconds), but much smaller in convenience stores (29 seconds). The smaller difference in convenience stores is directly attributable to the relatively small regression coefficient for coupon-only transactions presented in Exhibit 5-8. All food stamp coupon and cash differences are also statistically significant.

As shown at the bottom of Exhibit 5-10, EBT transactions take about 2 seconds longer to complete than comparable food stamp coupon transactions, when averaged across all store types. Within supermarkets, EBT transactions also take about 2 seconds longer to complete. In grocery stores the situation is reversed, with coupon transactions lasting about 2 seconds longer than comparable EBT transactions. Neither difference, however, is statistically significant. Only in convenience stores is there a significant difference in average EBT and coupon transaction times, with EBT transactions lasting about 22 seconds longer than coupon transactions.

Estimated Cost of Checkout Times -- Full Opportunity Cost.
Retailers' participation costs in the Food Stamp Program are defined as the value of the extra cashier time required for EBT and food stamp coupon

¹The average transaction times across all store types are computed by weighting times for specific store types by the ratio of average monthly food stamp sales to the number of observed transactions. These weights are 124.83 for supermarkets, 37.44 for grocery stores, and 9.39 for convenience stores. The weighting is necessary because food stamp transactions were not observed with equal probability across the three store types.

purchases. This definition assumes that all cashier time has opportunity cost -- that is, that the cashier could be doing something productive with the time and would not be idle during the incremental time needed to process food stamp transactions. Estimates based on this assumption are considered the "full cost" of the incremental time required for food stamp purchases.

To present these costs in terms of \$1,000 of benefits redeemed, average costs per transaction are multiplied by the number of transactions per \$1,000 of benefits redeemed. As expected, this varies by average purchase size, which tends to be larger at supermarkets.

Relative to comparable cash transactions, the extra time for EBT transactions translates into an average retailer participation cost of \$3.39 per \$1,000 of EBT benefits redeemed. This cost varies greatly by store type, ranging from \$1.80 (supermarkets) to \$11.74 (convenience stores). Exhibit 5-11 presents these patterns, along with participation cost estimates of the original system for comparison.

The variation in EBT participation cost by store type is primarily due to variation in the number of transactions required to redeem \$1,000 of EBT benefits. As shown in Exhibit 5-10, EBT transaction time increments did not vary greatly by store type. Because average wage is also relatively constant across store type (see Appendix VB), the value of the time increment does not vary. That is, the incremental cost of a single transaction is fairly constant across store types. However, the value of average supermarket EBT purchases is much higher than grocery store or convenience store transactions. Thus, supermarkets require fewer transactions to accumulate \$1,000 of EBT benefits, which translates into a much lower participation cost.

Food stamp coupon participation costs average \$3.01 per \$1,000 of benefits redeemed. Coupon costs vary less greatly by store type than EBT costs, but still display wide variation. Coupon costs range from \$1.73 (supermarkets) to \$6.99 (grocery stores).

As with EBT costs, the difference between food stamp coupon costs at supermarkets and grocery stores largely results from the number of transactions required to redeem \$1,000 in benefits. Even though a still greater number of transactions is required at convenience stores to generate \$1,000 in sales, coupon costs at convenience stores are lower than at grocery stores

Exhibit 5-11

Retailer Checkout Costs: Full Cost per \$1,000 of Benefits Redeemed

	MAJOR STORE TYPE			All Stores ^a
	Supermarket	Grocery Store	Convenience Store	
Phase C System				
EBT	\$1.80	\$6.61	\$11.74	\$3.39
Food Stamp Coupon	<u>1.73</u>	<u>6.99</u>	<u>6.68</u>	<u>3.01</u>
Difference	0.07	-0.38	5.06 **	0.38
Original System				
EBT	\$2.83	\$5.02	\$17.44	\$3.93
Food Stamp Coupon	<u>2.67</u>	<u>1.22</u>	<u>3.65</u>	<u>3.63</u>
Difference	0.16	3.80 **	13.79 **	0.30

Statistical significance: +, $P < 0.10$; *, $P < 0.05$; **, $P < 0.01$.

Note: ^aTotal times for all stores are based on weighted averages of data specific to individual store types. The weights reflect the ratio of monthly food stamp sales to observed transactions. Differences in total times are computed. Significance of these differences is based on patterns displayed at the store type level and not on statistical testing.

Source: Phase C and Late (original) Demonstration observation data.

because the time increment (relative to cash) is smaller (29 seconds versus 51 seconds, as shown in Exhibit 5-10).

Participation costs at supermarkets and grocery stores are roughly comparable under the EBT and food stamp coupon systems. EBT purchases at supermarkets are about \$0.07 more costly than coupon purchases per \$1,000 of benefits; grocery store EBT purchases are \$0.38 less costly than coupon purchases. EBT purchases at convenience stores, however, impose \$5.06 more in costs per \$1,000 of benefits than coupon purchases, primarily because of the relatively shorter coupon transaction times. Only the convenience store difference is statistically significant.

When averaged across all store types, Phase C estimates of EBT and coupon participation costs are somewhat lower than estimates made for the original demonstration period. The difference between EBT and coupon costs, however, is slightly larger in Phase C. For the original demonstration, estimated EBT costs exceeded coupon costs by \$0.30; this difference is \$0.38 during Phase C. Although the EBT-coupon difference narrowed for all three store types, the factors contributing to this change varied. For supermarkets and convenience stores, the improvement was partly due to lower EBT participation costs. The narrowing of EBT-coupon cost differences at grocery stores and convenience stores is due also in part to an increase in food stamp coupon transaction costs.

Estimated Cost of Checkout Times -- Limited Opportunity Cost. The extra time required for food stamp transactions does not always take employees away from other constructive activities. In some cases, the time would be idly spent waiting for the next customer, and the required extra time for a food stamp transaction would not introduce any opportunity cost.

To estimate the limited opportunity cost of food stamp purchases, we assume that if a food stamp transaction ends more than 20 seconds before the cashier begins processing the next transaction, any incremental time for the food stamp transaction did not impose an opportunity cost. To estimate the limited opportunity costs for EBT and coupon purchases, full incremental times for each store type are multiplied by the proportion of EBT and coupon transactions followed by a gap of less than 20 seconds. Appendix VB describes the procedures used.

Because a higher percentage of observed EBT transactions than coupon transactions was followed by at least a 20-second wait before the next customer, the limited opportunity costs present the EBT system in a more favorable light (compared to coupon costs) than the full opportunity costs. This was also true for the original EBT system. As shown in Exhibit 5-12, the limited opportunity cost estimates range from \$1.12 to \$5.06 per \$1,000 of EBT benefits redeemed, and from \$1.25 to \$5.34 per \$1,000 of food stamp coupons benefits redeemed. For all stores, the redesigned EBT system reduces costs by \$0.07 per \$1,000 of benefits redeemed, compared to the coupon system. During the original demonstration, the EBT system's limited opportunity costs were \$0.25 higher than coupon-related costs.

In summary, estimated EBT and coupon checkout costs during Phase C tend to be lower than the costs estimated during the original demonstration. Using the full cost measures, EBT costs have decreased from \$3.93 per \$1,000 benefits redeemed during the original demonstration to \$3.39 during Phase C. Coupon costs have dropped from \$3.63 (original demonstration) to \$3.01 (Phase C) per \$1,000 in redemptions. During Phase C, cost differences between the EBT and coupon systems are statistically significant only in convenience stores.

5.3 EBT EFFECTS ON HANDLING AND RECONCILIATION COSTS

Handling and reconciliation activities comprise the procedures retailers undertake to receive monetary credit for food stamp transactions as well as any bookkeeping activities undertaken to reconcile this credit with the food stamp sale it represents. This section presents the evaluation's estimate of EBT and food stamp coupon handling and reconciliation costs.

HANDLING AND RECONCILIATION ACTIVITIES

Coupon System. Paper food stamp coupons are a unique payment form with restricted handling and deposit procedures. To prepare food stamp coupons for deposit, the coupons must be collected from the cash drawers, sorted by denomination, counted, canceled like personal checks and, if required by the store's bank, bundled by denomination into groups of 100 coupons. Finally, a Redemption Certificate must be filled out which, along with a deposit slip, is presented with each coupon deposit to the store's

Exhibit 5-12

Retailer Checkout Costs: Limited Opportunity Cost
per \$1,000 of Benefits Redeemed

	MAJOR STORE TYPE			All Stores ^a
	Supermarket	Grocery Store	Convenience Store	
Phase C System				
EBT	\$1.12	\$3.94	\$5.06	\$1.98
Coupon	<u>1.25</u>	<u>5.34</u>	<u>1.62</u>	<u>2.05</u>
Difference	-0.13	-1.40	3.44 **	-0.07

bank. Retailers may further choose to reconcile their sales by comparing deposit receipts to monthly account activity statements from the bank..

EBT System. No food stamp coupon handling occurs in an EBT system. Every day at 2:00 p.m. the system totals each retailer's EBT activity for the previous 24 hours and initiates a process by which EBT credits are electronically deposited in the bank account specified by the retailer. Retailers are able to learn the amount of the day's deposit from three sources: signing a terminal off the system at 2:00 p.m. to provide a printed record of the purchases and refunds processed by the terminal since it was signed on; calling the EBT hotline, where staff can query the system for the deposit amount; or calling the VIPS service from a pushbutton phone and receiving a recorded message of the most recent store deposit amount.¹ Stores can reconcile food stamp sales with deposits by tracking daily deposits from any of these three sources and comparing these amounts with the deposited amounts that appear on the store's monthly bank account summary statement.

METHODOLOGY

Handling and reconciliation costs are defined as the average monthly labor costs to perform the activities described above. Retailers were asked to estimate the amount of staff time required for these activities and to provide wage information for the relevant staff members. Wages were imputed for those staff members for which retailers were unable or unwilling to provide wage information. Imputed wages are based on the mean of reported wages for common employee types within the same store type.²

As with other analyses in this chapter, handling and reconciliation costs are standardized per \$1,000 of benefits redeemed. If average monthly redemption is very low, measurement error can become exaggerated by this standardization. Thus, we exclude from the analysis any stores with less than \$25 in average monthly EBT or coupon redemptions.

¹VIPS service was made available to all retailers during the fall of 1987, approximately three months after the Phase C EBT system was implemented.

²Among all employee types except store managers and store owners, complete wage data were provided for 90.2 percent of the employee types. Among managers and store owners, however, complete wage data were provided for only 64.8 percent of the cases.

ESTIMATED HANDLING AND RECONCILIATION COSTS

Food retailers generally perceive that the EBT system requires less staff time than coupons for handling and reconciliation activities. For the full sample (including "other stores" as well), estimated costs are consistent with this notion. Estimated handling and reconciliation costs for all stores are \$9.62 per \$1,000 of EBT benefits redeemed, less than one-half the cost of handling food stamp coupons. This difference is statistically significant. Exhibit 5-13 presents this result, along with estimated EBT and coupon handling costs within store types.

Although coupon costs exceed EBT costs for all stores combined, the pattern is inconsistent across store types. EBT handling costs at supermarkets and grocery stores are markedly lower than coupon handling costs per \$1,000 of redemptions. The opposite result occurs in convenience stores and other stores. (Only the grocery store and convenience store differences, however, are statistically significant.) We know of no significant procedural differences in the way food stamp coupons or EBT purchases are handled and reconciled to explain the variation across store types.

The data presented in Exhibit 5-13 suggest scale economies in the time required to handle and reconcile EBT sales. Supermarket employees average approximately 15.5 hours per month to perform these activities. Although this level may appear high, it translates into only slightly over one hour per \$1,000 of EBT purchases. In contrast, these activities take between three and five hours at convenience and grocery stores, which process only about 11 percent of the supermarket EBT volume. Even though supermarkets pay slightly higher average wages, the efficiency of larger redemption levels makes supermarkets' EBT handling and reconciliation costs between \$5 and \$6 less per \$1,000 than at grocery or convenience stores. The very high cost of EBT reconciliation in "other stores" may be further evidence of scale economies, although it might simply reflect sampling error due to the relatively small number of such stores (10) in the sample.

No similarly clear pattern of economies appears for handling food stamp coupons. Although the cost per \$1,000 is higher in grocery stores than supermarkets, which might suggest scale economies, convenience and other stores report lower costs per \$1,000 of benefits redeemed than supermarkets. The very small numbers of convenience and other stores in the sample, however, mean that these costs can only be considered suggestive.

Handling and Reconciliation Costs of Coupon and EBT Systems

	MAJOR STORE TYPE				All Stores
	Super-Markets	Grocery Stores	Convenience Stores	Other Stores	
Average handling time per month (hrs.)					
EBT	15.42	3.66	4.76	2.26	6.44
Coupon	14.13	1.45	1.15	0.19	5.79
Average wage (\$/hr)					
EBT	\$7.27	\$5.77	\$4.73	\$7.92	\$6.19
Coupon	\$7.12	\$6.37	\$4.86	\$8.07	\$6.51
Average cost/store/month ^a					
EBT	\$111.85	\$22.06	\$21.39	\$16.68	\$42.59
Coupon	\$99.89	\$9.04	\$5.62	\$1.55	\$40.04
Average cost per \$1,000 benefits redeemed ^b					
EBT	\$7.78	\$14.16	\$13.18	\$41.68	\$9.62
Coupon	<u>\$18.54</u>	<u>\$40.99</u>	<u>\$8.69</u>	<u>\$15.86</u>	<u>\$19.19</u>
EBT - Coupon Difference	-\$10.76	-\$26.83**	\$4.49*	\$25.82	-\$9.57**
Percent Difference	-138.2%	-189.4%	34.0%	62.0%	-99.6%

Number of Stores					
EBT	22	49	14	10	95
Coupon	20	26	8	3	57
Average Store Redemption					
EBT	\$14,369	\$1,558	\$1,623	\$556	\$4,429
Coupon	\$5,388	\$221	\$646	\$98	\$2,087
Standard Error ^c					
EBT	\$1.78	\$3.28	\$4.50	\$12.84	\$1.72
Coupon	\$5.15	\$8.90	\$2.65	\$7.15	\$5.41

Statistical Significance: +, $P < 0.10$; *, $P < 0.05$; **, $P < 0.01$.

Notes: ^a Average cost per store per month was derived by multiplying handling time and wage for each store, then averaging by store type.

^b Cost per \$1,000 of benefits redeemed represents a weighted average of individual store ratios of cost to \$1,000 of benefits redeemed at the store. Each store cost ratio is weighted by the store's redemption volume relative to total volume for other stores in the store type.

^c Measures the variation of store cost per \$1,000 of redemptions relative to the sample mean, weighted by redemption volume. See Appendix VB for a discussion of the standard errors and statistical significance.

Source: Phase C retailer interview data.

Although it was hypothesized that Phase C design changes would reduce EBT reconciliation costs, the estimates of these costs in Exhibit 5-13 are higher than estimates for the original system. The increase is most noticeable in terms of cost per \$1,000 in benefits redeemed. As shown in Exhibit 5-14, the estimated costs between the original and Phase C periods increase from \$4.69 to \$9.63. Estimated food stamp coupon costs are also greater during Phase C, rising from \$12.93 to \$19.96 per \$1,000 of benefits redeemed. Exhibit 5-15 breaks down the comparison by store type.

Retailers report spending more time reconciling \$1,000 worth of EBT sales during Phase C than during the original demonstration. One hypothesis for this increase is that the increase in retailer reconciliation effort is prompted by the greater amount of deposit information available during Phase C. Other data sources, however, do not necessarily support this hypothesis. When asked how frequently they use the VIPS deposit information, roughly 65 percent of the sample responded "never" and another 13 percent had never heard of VIPS. Thus, for reasons unknown, retailers spent more time during Phase C reconciling the same information available during earlier periods of the EBT demonstration. This is particularly so within the "other store" category.

An alternative hypothesis is that Phase C estimates of retailer EBT reconciliation time appear high only because estimates for the original system were unusually low. Retailers considered reconciliation a much more serious problem during the original demonstration than during Phase C. Retailer frustration with the reconciliation process during the original demonstration may have caused them to accept the reported value of monthly EBT sales rather than spending substantial effort to reconcile the amount. Under this interpretation, retailers in Phase C are no longer put off by the problems of reconciling EBT sales and are willing to spend the time required to verify these amounts.

The rise in coupon handling costs per \$1,000 of benefits between the original demonstration and Phase C may stem from lower redemption levels during Phase C. Certain coupon handling activities are independent of the volume of coupons redeemed (e.g., food stamp redemption certificates must accompany all coupon deposits), and the presence of these activities may account for the only slight decrease in Phase C in the amount of time

Exhibit 5-14

EBT and Coupon Handling and Reconciliation Costs
for Original and Phase C Systems

	Original System	Phase C System
Average handling time per month (hrs.)		
EBT	2.30	6.38
Coupon	6.13	5.63
Average wage (\$/hr)		
EBT	\$7.40	\$6.20
Coupon	\$7.22	\$6.46
Average cost/store/month		
EBT	\$16.11	\$42.19
Coupon	\$47.63	\$38.84
Average cost per \$1,000 benefits redeemed		
EBT	\$4.69	\$9.63
Coupon	<u>\$12.93</u>	<u>\$19.26</u>
EBT - Coupon Difference	-\$8.24	-\$9.63
Percent Difference	-63.7%	-50.0%

Number of Stores		
EBT	100	96
Coupon	117	59
Average Store Redemption		
EBT	\$3,093	\$4,429
Coupon	\$3,663	\$2,087

Sources: Phase C and Late (original) Demonstration retailer interview data.

William L. Hamilton, et al., *op. cit.*, p. 146. Average handling time based on retailer response to the amount of time required to handle and reconcile EBT and paper food stamp coupon sales.

Exhibit 5-15

**EBT and Coupon Handling and Reconciliation Costs
for Original and Phase C Systems, by Store Type**

Average cost per \$1000 benefits redeemed	Original System	Phase C System
Supermarkets		
EBT	\$2.86	\$7.78
Coupon	\$5.84	\$18.54
Grocery Stores		
EBT	\$7.90	\$14.16
Coupon	\$20.00	\$40.99
Convenience Stores		
EBT	\$12.20	\$13.18
Coupon	\$42.77	\$8.69
Other Stores		
EBT	\$25.96	\$41.68
Coupon	\$69.74	\$15.86

Sources: Phase C and Late (original) Demonstration retailer interview data.

William L. Hamilton, et al., op. cit., p. 146. Average handling time based on retailer response to the amount of time required to handle and reconcile EBT and paper food stamp coupon sales.

required, despite a sizable drop in coupon redemptions. As mentioned in the discussion of Exhibit 5-13, however, this hypothesis of scale economies is not supported by differences in coupon handling costs and redemption levels across store types during Phase C.

In summary, the data indicate a rise in EBT handling costs during Phase C, possibly due to an increase in the amount of time retailers are willing to spend on these activities. EBT handling costs do not rise in proportion to increases in redemption levels, however. Coupon handling costs also rose during Phase C, and the magnitude of the difference in EBT and coupon handling costs remained nearly the same during the two periods.

5.4 EBT EFFECTS ON TRAINING COSTS

For newly hired checkout clerks or other store personnel who will handle sales, retailers must provide training on store rules and procedures for accepting payment by food stamps. Training must also cover Food Stamp Program regulations, such as which goods may be purchased with food stamp benefits. In Reading, where both food stamp coupons and EBT benefits are acceptable payment forms, retailers must train clerks on both systems. This section presents the estimated costs for these activities.

TRAINING PROCEDURES

Coupon System. Store checkout clerks must know the special rules and procedures governing food stamp purchases and refund transactions. For food stamp training, clerks are often given a pamphlet prepared by FNS that describes allowable items and outlines program regulations. Clerks are also instructed not to accept loose coupons denominated larger than one dollar (unless the client can provide the booklet with matching serial numbers), to give loose one dollar coupons for change exceeding \$0.99, and to treat food stamp customers equally to other store customers. The penalty for non-compliance can be severe (offenders can face penalties ranging from six-month to permanent disqualification from program participation), so retailers usually review program regulations carefully with new hires during training.

EBT Training. Many of the issues pertinent to food stamp coupons apply to EBT system training as well. Cashiers must know food stamp program

requirements about allowable items, verifying client identity, and equal treatment for food stamp clients. Additionally, however, cashiers must be trained on how to properly execute an EBT purchase transaction, including the following operations:

- swiping a benefit card through the terminal and verifying a PIN match;
- entering the purchase amount on the EBT terminal;
- responding to data messages, where applicable; and
- providing customer receipts.

In addition to processing purchase transactions, checkout cashiers may be responsible for non-routine transactions, such as manual sales, refund transactions or terminal sign-on/sign-off. Although no more complex than normal purchase transactions, refund transactions and terminal sign-on/sign-off require the use of the store card and store PIN, which for control purposes are normally retained by the store owner or manager. Manual sales, however, require more effort. To complete a manual sale, a cashier must:

- determine that equipment or system failure has made the system unavailable (in stores having in-store EBT equipment these are the only allowable conditions for a manual sale);
- restrict the client's EBT purchase to less than \$35 in total value;
- call the EBT hotline using the phone on the BTT to authorize the purchase;
- complete and have the customer sign a manual authorization form; and
- give one copy of the form to the customer and retain the other for store use.

The extent of required EBT training, therefore, may vary across stores if some owners or managers decide not to train all cashiers in all possible EBT functions.

METHODOLOGY

The cost to train a cashier on EBT or food stamp coupon system use is simply the product of the amount of training time required for either system and the cashier's hourly wage during training. A store's monthly training cost is achieved by multiplying individual cashier training cost by the average monthly number of newly hired cashiers.

Data collected during Phase C interviews with participating retailers serve as the basis for EBT training costs. However, food stamp coupon training costs are estimated using data collected during both the original and extended EBT demonstrations. Food stamp training costs are relatively fixed and do not vary greatly with the volume of food stamp benefits redeemed. Because food stamp coupon redemptions were smaller during the extended demonstration, food stamp coupon training costs would be distorted if these costs were standardized in terms of \$1,000 of coupon redemptions. As a result, food stamp coupon training costs are estimated in this section using average training time and food stamp coupon redemptions from the original demonstration, adjusted to reflect cashier wage levels during the extended demonstration.

This analysis does not include start-up training for new retailers joining the demonstration (which occurs after they are certified eligible to participate in the Food Stamp Program and their EBT store equipment is installed). While retailer time spent during this training adds to participation cost, this one-time cost becomes very small when amortized over the lifetime of the retailer's participation. The analysis therefore focuses on ongoing training for cashiers hired after the store is participating in the program.

Training cost estimates presented in this section include data from some retailers who report no training costs. Zero training costs can arise from two situations. First, monthly training cost may average to near zero because a store rarely or never hires a new cashier. This occurs in small "mom and pop" grocery stores operated by family members. The other situation occurs when stores simply choose not to train clerks in EBT system use or in transacting food stamp coupons. These stores may process food stamp transactions so rarely that only the store manager or owner handles such transactions.

ESTIMATED TRAINING COSTS

Retailers' estimated training costs on the EBT and coupon systems are presented in Exhibit 5-16. Across all stores, EBT training costs average \$0.55 per \$1,000 of benefits redeemed. Coupon-related training costs are somewhat lower, at \$0.47 per \$1,000 of redemptions.

Time spent training new hires on EBT and coupon procedures is nearly the same between the two systems. EBT training time averages about 35 minutes and does not vary greatly by store type. Coupon training is slightly longer (about 40 minutes) and varies more by store type. Supermarkets take nearly one hour for coupon training while other retailers spend, on average, about 30 minutes.

The variation in ongoing training costs across store types is primarily determined by the average number of new staff hired at the store each month. Stores with high rates of employee turnover, such as supermarkets and convenience stores, typically incur the highest monthly training costs. Grocery stores and other more specialized food stores tend to hire fewer new employees during an average month. As a result, these store have lower average training costs.

5.5 EBT SYSTEM EFFECTS ON RESHELVING COSTS

One of the early concerns about the EBT system was that recipients would have trouble remembering their account balance. Retailers feared that this problem would create delays in the checkout lines as recipients attempted purchases exceeding their account balance. This section examines a related issue, the cost incurred when retailers have to reshelve unpurchased groceries because EBT clients do not have sufficient balances or food stamp coupon clients have insufficient coupons in hand. EBT reshelving costs are also broadly interpreted to include other EBT system-related events which may result in stores needing to reshelve unpurchased groceries. Included in this interpretation would be reshelving required because the system was down and the total value of an EBT purchase exceeded the \$35 limit imposed on manual sales.

Exhibit 5-16

Training Costs for Coupon and EBT Systems

	MAJOR STORE TYPE				All Stores
	Super-Markets	Grocery Stores	Convenience Stores	Other Stores	
Average new hires/ store/month					
EBT	2.28	0.46	1.29	0.93	1.18
Coupon	2.90	0.23	2.22	0.13	1.19
Average training time (hrs)					
EBT	0.65	0.42	0.72	0.75	0.59
Coupon	0.98	0.54	0.51	0.45	0.67
Average cashier Wage (\$/hr)					
EBT	\$3.91	\$4.06	\$4.07	\$4.22	\$4.04
Coupon	\$3.91	\$4.01	\$4.08	\$4.22	\$4.02
Average cost/ store/month ^a					
EBT	\$5.25	\$0.34	\$3.03	\$1.43	\$1.87
Coupon	\$7.72	\$0.07	\$3.45	\$0.05	\$1.97
Cost/\$1,000 of benefits redeemed ^b					
EBT	\$0.36	\$0.30	\$2.67	\$3.33	\$0.55
Coupon	<u>\$0.43</u>	<u>\$0.06</u>	<u>\$2.26</u>	<u>\$0.07</u>	<u>\$0.47</u>
EBT - Coupon Difference	-\$0.07	-\$0.24	-\$0.50	-\$2.26	-\$0.08
Percent difference	-19.4%	-80.0%	-18.7%	-50.6%	-14.5%
Number of Stores					
EBT	16	46	18	11	91
Coupon	17	12	16	5	50

Notes: ^a Average cost per store was derived by multiplying handling time and wage for each store, then averaging by store type. Average coupon store costs were computed using original estimates, factored to reflect Phase C wage levels.

^b Cost per \$1,000 of benefits redeemed represents a weighted average of individual store ratios of cost to \$1,000 of benefits redeemed at the store. Each store cost ratio is weighted by the store's redemption volume relative to total volume for other stores in the store type. Coupon costs are based on original demonstration estimates, factored to reflect Phase C wage levels.

Source: Phase C and Original Demonstration retailer interview data.

METHODOLOGY

Retailer reshelving costs are estimated using the same basic method used to estimate other labor-related costs. Retailers were asked to estimate the amount of time spent each month reshelving groceries because customers had insufficient EBT or coupon balances, and the wage levels of staff members responsible for reshelving.¹ Average monthly store cost equals the product of these two variables. These costs are then standardized per \$1,000 of benefits redeemed.

ESTIMATED COUPON AND EBT RESHELVING COSTS

Estimated retailer EBT and coupon reshelving costs are presented in Exhibit 5-17. EBT reshelving costs average \$1.83 per \$1,000 of benefits redeemed. Coupon reshelving costs are slightly lower, averaging \$1.01 per \$1,000 of food stamp coupon sales. The difference between standardized EBT and coupon costs (\$0.82) is statistically significant at the 5-percent level.

This result contrasts sharply with reshelving costs estimated during the original EBT demonstration. At that time, EBT and coupon reshelving costs were both estimated to be roughly \$0.45 per \$1,000 of food stamp redemptions. The increased cost is primarily due to higher Phase C wages, however, inasmuch as actual time spent reshelving groceries declined in both systems.

Reshelving time differences between the two time periods may reflect the episodic nature of reshelving requirements. For instance, a large period of (scheduled) EBT system downtime occurred on Saturday, May 21, 1988 (right in the middle of the data collection period), and retailers may have spent considerable time reshelving that day. Thus, even though EBT reshelving time decreased during Phase C, this incident serves to illustrate that the need for reshelving in either system can vary over time in response to customer behavior or system problems.

¹As with handling costs, wages were imputed when respondents were unable to provide wage data. For reshelving data, 88.3 percent of the stores provided complete wage information.

Reshelving Costs for Coupon and EBT Systems

	MAJOR STORE TYPE				All Stores
	Super-Markets	Grocery Stores	Convenience Stores	Other Stores	
Average reshelving time/month (hrs)					
EBT	5.11	0.49	0.26	0.47	1.35
Coupon	1.15	0.04	0.04	0.00	0.32
Average wage (\$/hr) ^a					
EBT	\$4.81	\$6.78	\$4.64	\$5.71	\$5.75
Coupon	\$5.20	\$6.60	\$4.25	\$0.00	\$5.39
Average reshelving cost/month ^b					
EBT	\$22.28	\$3.36	\$1.02	\$1.88	\$6.49
Coupon	\$5.21	\$0.23	\$0.15	\$0.00	\$1.48
Cost/\$1000 of benefits redeemed					
EBT	\$1.74	\$2.27	\$0.85	\$2.80	\$1.83
Coupon	<u>\$1.06</u>	<u>\$1.32</u>	<u>\$0.32</u>	<u>\$0.00</u>	<u>\$1.01</u>
EBT - Coupon difference	\$0.69*	\$0.95*	\$0.53	\$2.80	\$0.82*
Percent difference	39.4%	41.9%	62.5%	undefined	44.6%

Number of Stores					
EBT	18	48	16	10	92
Coupon	18	33	11	8	70
Average Redemption					
EBT	\$12,768	\$1,478	\$1,202	\$671	\$3,551
Coupon	\$4,934	\$177	\$486	\$243	\$1,456
Standard Error ^c					
EBT	\$0.49	\$0.89	\$0.55	\$2.07	\$0.46
Coupon	\$0.42	\$0.96	\$0.32	\$0.00	\$0.40

Statistical Significance: +, $P < 0.10$; *, $P < 0.05$; **, $P < 0.01$

Notes: ^a Average wages vary across payment type because of slight sample differences.

^b Average cost per store per month is computed as the average of individual store costs within a store type. Store costs are the product of monthly reshelving time for a given employee type and the average wage for that employee type, summed over all employee types. Cost per \$1,000 of benefits redeemed is computed according to the same weighting procedure described for handling costs.

^c Measures the variation of store cost per \$1,000 of redemptions relative to the sample mean, weighted by redemption volume. See Appendix VB for a discussion of the standard errors and statistical significance.

Source: Phase C retailer interview data.

5.6 EBT SYSTEM EFFECTS ON FUNDS FLOAT

Float is a measure of lost earning power when funds are idle and not accruing interest. In the retail food industry, float measures the earning power which is lost from the time a purchase is made until the payment for the purchase is deposited in the store's bank account. Float thus depends on the frequency of deposits to the bank, the average size of a deposit, and the rate of interest earned on deposits.

FLOAT OF FOOD STAMP BENEFITS

In the coupon system, funds float is the interest lost during the time between a food stamp coupon purchase and when the coupons are deposited (given same day or next business day credit for the deposit). Depositing coupons more often, therefore, decreases float costs.

Restrictions banks may place on food stamp coupon deposits also influence retailer funds float. Some banks charge a handling fee if retailers' food stamp coupon deposits are not already bundled into groups of 100 coupons of the same denomination. Under this arrangement, funds float might increase dramatically for stores which conduct little food stamp coupon business. To avoid such bank charges, these stores must accumulate food stamp coupons until the minimum number for deposit is reached, foregoing earning power during the entire time. Reading banks, however, place no such restrictions on coupon deposits.

The EBT system is designed to credit retailers for food stamp redemptions regularly and regardless of sales volume. Every day at 2:00 p.m., retailers' EBT transactions over the previous 24 hours are totaled and the redemption process begun. Sales made before the 2:00 p.m. cutoff are generally credited to retailer accounts by the following banking day. EBT sales made after 2:00 p.m. or on weekends or holidays receive credit two days after the sale. Thus, the average period of EBT float should be between one and two days.

METHODOLOGY

Estimated float costs for food stamp coupon and EBT purchases are the product of three components: the average daily interest rate, the average

number of days between sale and crediting, and the average EBT and coupon deposit amount. This approach implicitly assumes that retailers deposit all food stamp receipts into interest-bearing accounts. Although not all retailers may follow this practice, we employ the assumption to measure the earnings that could be realized during the time between sale and credit.

Approximately 88 percent of the stores in the evaluation sample use one of three local banks in Reading. During the interview period, the average rate of interest on demand deposits at these three banks was 4.84 percent per year.

The second component of float costs is the average number of days between sale and crediting. For food stamp coupons, the number is based on how often retailers deposit coupons in an average week. For example, assuming an average six-day store week, a retailer who deposits food stamp coupons twice a week has an average number of days between sale and deposit of 1.5 days. Dividing average weekly food stamp coupon volume by the average number of deposits per week provides the third component of coupon float costs (i.e., the average food stamp coupon deposit amount).

The EBT system makes retailer deposits of food stamp receipts unnecessary. Retailer cutoff at 2:00 p.m. and transmission of data into the Automated Clearing House system are routine and scheduled parts of daily EBT operations. As such, the amount of time between EBT sale and retailer deposit is not expected to vary greatly on a daily basis. Retailers were asked how long they felt this process took, and their responses are used to estimate EBT system float costs.

ESTIMATED COST OF FUNDS FLOAT

For EBT purchases, most retailers estimate that the time between purchase and credit is approximately one and one-half days, as expected given the system's design. Food stamp coupon purchases take slightly longer to credit; retailers estimate a little over two days between coupon purchase and credit. These estimates translate into monthly costs of about \$0.15 per \$1,000 of EBT redemptions and \$0.20 per \$1,000 of coupon purchases (Exhibit 5-

10) ~~_____~~

Float Costs For Coupon And EBT Systems

	MAJOR STORE TYPE				All Stores
	Super-Markets	Grocery Stores	Convenience Stores	Other Stores	
Average total days from sales to credit					
EBT	1.43	1.40	1.13	2.14	1.45
Coupon	2.04	2.11	2.80	1.99	2.14
Average Cost/store/month ^a					
EBT	\$2.09	\$0.26	\$0.14	\$0.33	\$0.62
Coupon	\$1.10	\$0.04	\$0.22	\$0.04	\$0.32
Cost/\$1,000 of benefits redeemed					
EBT	\$0.14	\$0.15	\$0.14	\$0.47	\$0.15
Coupon	<u>\$0.19</u>	<u>\$0.22</u>	<u>\$0.79</u>	<u>\$0.17</u>	<u>\$0.20</u>
EBT - Coupon difference	-\$0.05	-\$0.07	-\$0.66	\$0.30	-\$0.05
Percent difference	-33.3%	-47.2%	-480.2%	64.6%	-34.4%

Number of stores					
EBT	14	40	8	7	69
Coupon	14	30	5	7	56
Average Redemption					
EBT	\$14,429	\$1,697	\$1,047	\$709	\$4,105
Coupon	\$5,706	\$167	\$283	\$246	\$1,572
Standard Error ^b					
EBT	\$0.08	\$0.03	\$0.06	\$0.23	\$0.06
Coupon	\$0.05	\$0.08	\$0.75	\$0.11	\$0.06

No EBT-coupon differences are statistically significant.

Notes: ^aAverage cost per store per month is computed on the average of stores within a store type. Cost per \$1,000 of benefits redeemed is computed according to the same procedure described for handling costs.

^bMeasures the variation of store cost per \$1,000 of redemptions relative to the sample mean, weighted by redemption volume. See Appendix VB for a discussion of the standard errors and statistical significance.

Source: Phase C retailer interview data.

Supermarket, grocery, and "other store" estimates of about two days between coupon sale and credit suggest near daily deposit of food stamp coupon receipts by these stores (i.e., assuming reasonable bank-imposed hold periods and credits for deposits made the next banking day). Convenience store estimates of this time period are slightly longer (2.8 days).

Stores classified as "other store" types are the only stores to estimate a longer float period for EBT purchases than for coupon purchases. As explained in Chapter 7, some small banks in Reading may receive EBT deposit data from the Federal Reserve by general mail delivery (rather than electronically or by overnight courier). If several of the "other stores" bank at these small institutions, the longer estimate of time between EBT sale and credit is quite possible.

5.7 EBT SYSTEM TELEPHONE COSTS

As with most on-line point-of-sale systems, the EBT system transmits data messages between the system computers and store terminals through commercial telephone lines. The majority of store terminals communicate with the EBT system through special Centrex communications lines which are dedicated to EBT system use and for whose use the State of Pennsylvania is billed directly. Because Centrex service is limited to certain geographic regions in the Reading area, however, terminals located at a small number of stores either use regular telephone lines dedicated to the EBT terminal or communicate through the telephone line used for other store business. In the former case PDPW is billed directly for the communications service. In the latter case, the retailer is instructed to submit the monthly telephone bill to PDPW, which will remit payment for the EBT portion of the bill directly to the telephone company. During the period of data collection (April-June, 1988), approximately ten retailers shared telephone service in this manner.¹

Although the Pennsylvania Department of Public Welfare offers to pay fully for any extra telephone charges caused by the EBT system, full payment

¹EBT system sharing of telephone service does not necessarily imply additional monthly telephone bills. All communications from the EBT terminals are local calls. Thus, only stores with measured local line service (which limits the number of "free" monthly outgoing local calls) incur an additional telephone expense from the EBT system.

does not always occur. Store owners must submit proof of the charges, an effort which some retailers may perceive as exceeding the value of the charges. Store owners and the PDPW may also disagree on the payment amount, and the store owner may feel the amount determined by PDPW is insufficient. This section addresses EBT-related telephone charges for which retailers believe they have not been fully compensated.

METHODOLOGY

As implied above, estimates of unreimbursed telephone charges are based on retailer perceptions.¹ Retailers were asked the estimated amount of their monthly telephone bill which was due to the EBT system and which was not reimbursed by PDPW. Sample-wide and store-type averages are estimated by combining non-zero and zero responses.

ESTIMATED UNREIMBURSED TELEPHONE COSTS

A total of five stores reported paying a monthly average of \$17.20 in unreimbursed EBT-related telephone charges (Exhibit 5-19). This group comprises four grocery stores and one "other store". This cost translates to roughly \$0.26 per \$1,000 of EBT benefits redeemed, when stores with zero costs are included.

5.8 EBT SYSTEM IMPACTS ON LOSSES FROM ACCOUNTING ERRORS

For purposes of examining retailer participation costs, an accounting error loss is defined as the value of any permanently unresolved discrepancies between the amount credited to a retailer's bank account and the actual value of food stamp sales. Discrepancies which are eventually reconciled -- such as those resulting from confusion over the 2:00 p.m. daily deposit cutoff -- are not considered here, although retailer labor to resolve these differences was included in Section 5.3.

Coupon System. Because food stamp coupon handling is a labor-intensive process, accounting errors can occur at many different stages

¹PDPW has not kept records on the frequency of telephone billing disagreements.

Telephone Costs for the EBT System

	MAJOR STORE TYPE				All Stores
	Super-Markets	Grocery Stores	Convenience Stores	Other Stores	
Number and percentage of stores with non-zero costs	0 (0.0%)	4 (8.5%)	0 (0.0%)	1 (10.0%)	5 (5.6%)
Average non-zero monthly cost	\$0.00	\$20.25	\$0.00	\$5.00	\$17.20
Cost/\$1,000 of benefits redeemed ^a	\$0.00	\$1.51	\$0.00	\$0.78	\$0.26

Number of Stores EBT	18	47	16	10	91
Average Redemption EBT	\$14,092	\$1,143	\$1,320	\$639	\$3,680
Standard Error ^b EBT	\$0.00	\$0.83	\$0.00	\$0.78	\$0.14

Notes: ^aCost per \$1,000 benefits is computed over all stores, including those with zero costs.

^bMeasures the variation of store cost per \$1,000 of redemptions relative to the sample mean, weighted by redemption volume. See Appendix VB for a discussion of the standard errors.

Source: Phase C retailer interview data.

between purchase transaction and credit to the retailer's account. Food stamp coupons could be miscounted by the cashier or staff member responsible for store accounts, the redemption certificate could be filled out incorrectly, or the bank could credit the store incorrectly.

Because coupons are tangible, however, accounting errors are often resolved by physically re-counting the number of coupons. Permanent accounting losses are infrequently detected.

EBT System. Theoretically, accounting losses under an EBT system occur only when a store's bank account is incorrectly credited for the value of food stamp purchases made at the store. Given this definition, the potential for a permanent accounting error is probably greatest with a transaction reversal. As mentioned earlier, a transaction reversal occurs when the EBT system does not complete transaction processing. When a transaction is reversed, the retailer's account is not credited and the recipient's account is not debited. If the cashier fails to notice that the transaction was reversed, the client can take groceries home without the retailer receiving credit for the sale.

A permanent accounting error can arise from a transaction reversal in two ways. First, if neither the retailer nor the BCAO (which monitors reversal activity) notice that a reversed transaction was not followed by a completed transaction, a permanent accounting error would occur for the amount of the sale. Second, if the reversal is identified after the recipient has left with the groceries and the recipient either (1) does not return to the store or go to the welfare office, (2) has spent all of his or her benefits, or (3) cannot be located, the retailer would lose the amount of that sale.

Accounting errors resulting from other types of transactions are less likely. Mobile vendors who transact manual sales without telephone authorization may experience a loss if the recipient does not have a sufficient balance. Mobile vendors process less than .01 percent of the total monthly EBT volume, however. The manual transaction process could create another type of accounting error if the amount authorized differs from the amount recorded on the manual sales slip. Because BCAO staff indicate that this type of discrepancy has never happened, it is unknown how such a discrepancy would be resolved.

Given the low probability with which permanent accounting errors occur and the lack of any systematic reporting on the frequency and magnitude of accounting errors, this section is based on retailer perceptions of accounting losses rather than documented events. Retailer perceptions of accounting losses, however, may be somewhat distorted by the reconciliation difficulties mentioned earlier. That is, true accounting losses may go undetected if retailers choose not to reconcile their accounts, and retailers unable to reconcile their account may perceive an accounting loss when none actually exists. These two errors, if they occur, are partially offsetting.

METHODOLOGY

Accounting errors typically involve three kinds of cost: the labor cost of attempting to resolve the error, the interest foregone by the inavailability of the funds, and finally the value of the funds themselves.

The cost measured in this section captures only the final component -- that is, the value of funds retailers believed were permanently lost through accounting errors. The labor cost of attempting to resolve accounting errors may have been included in the handling and reconciliation components examined in Section 5-3, but retailers were not explicitly told to include such labor. Foregone interest on unavailable funds is considered too small in any given store to be measurable.

The estimated costs of food stamp accounting errors are based on retailer recall of the incidence and value of permanent losses under the EBT and food stamp coupons. To provide a time dimension for these estimates, retailers were asked to identify losses occurring since introduction of the Phase C EBT system.

ESTIMATED COST OF ACCOUNTING ERRORS

Reported accounting error losses were largely episodic, although in some cases losses involved consequential sums of money. Ten stores reported permanent EBT losses amounting to an average monthly value of \$8.35 (Exhibit 5-20). Two supermarkets reported permanent coupon losses, which cost the two stores approximately \$0.23 per month. Measured per \$1,000 of benefits redeemed, losses are about \$0.26 in the EBT system and negligible with coupons. The difference between EBT and coupon losses is statistically significant at the 10-percent level.

Exhibit 5-20

Accounting Error Losses for Coupon and EBT Systems

	MAJOR STORE TYPE				All Stores
	Super-Markets	Grocery Stores	Convenience Stores	Other Stores	
Number of stores reporting non-zero losses					
EBT	5	4	1	0	10
Coupon	2	0	0	0	2
Average monthly value of permanent losses for stores with non-zero losses					
EBT	\$5.16	\$13.96	\$1.82	\$0.00	\$8.35
Coupon	\$0.23	\$0.00	\$0.00	\$0.00	\$0.23
Cost/\$1,000 of benefits redeemed ^a					
EBT	\$0.12	\$0.75	\$0.08	\$0.00	\$0.26
Coupon	<u>\$0.00</u>	<u>\$0.00</u>	<u>\$0.00</u>	<u>\$0.00</u>	<u>\$0.00</u>
EBT - Coupon difference	\$0.12	\$0.75	\$0.08	\$0.00	\$0.26+

Number of Stores					
EBT	18	51	19	12	100
Coupon	18	41	14	8	81
Average Redemption					
EBT	\$12,041	\$1,549	\$1,256	\$676	\$3,231
Coupon	\$5,245	\$156	\$390	\$251	\$1,337
Standard Error ^b					
EBT	\$0.05	\$0.42	\$0.08	\$0.00	\$0.10
Coupon	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Statistical Significance: +, $P < 0.10$; *, $P < 0.05$; **, $P < 0.01$.

Notes: ^a Costs per \$1,000 of benefits are calculated over all stores, including those with zero losses.

^b Measures the variation of store cost per \$1,000 of redemptions relative to the sample mean, weighted by redemption volume. See Appendix VB for a discussion of the standard errors and statistical significance.

Source: Phase C retailer interview data.

These results are fairly consistent with accounting error incidence and loss estimated during the original EBT demonstration. At that time a total of thirteen incidents of EBT accounting error loss averaging \$0.58 per \$1,000 of benefits redeemed were reported.¹ Supermarkets reported the greatest number of accounting errors during the original demonstration (eight) with an average value of \$13.75 -- over twice as high as during the current analysis. Unlike the current analysis, no coupon losses were reported during the original demonstration.

The exact nature of permanent accounting errors is unclear. As mentioned earlier, there exists no routine reporting system to document these events, and retailer perceptions of accounting losses may be inexact. Although retailers report substantial consequences of accounting losses -- one retailer reported losing \$200.00 -- the extent to which accounting error losses actually occur remains uncertain.

In addition to the above losses from accounting errors, retailers might lose EBT credits if a disaster at the EBT data processing center destroyed a day's worth of credit information. As explained in Chapter 4, these losses would average 0.02 percent of monthly redemptions (or \$0.20 per \$1,000 of benefits redeemed) if such a loss occurred once in 10 years and no credit information was recovered from the retailer's journal tapes. Because no database disasters occurred during the EBT demonstration, the actual losses due to this potential vulnerability are zero.

5.9 EBT SYSTEM IMPACTS ON SPACE COSTS

Front-end space in retail food stores is highly valued by retailers. This space is at the checkout counter where impulsively purchased and high-markup items are displayed and customer loyalties and perceptions of store operations are last influenced. This section estimates the cost of front-end space utilized by EBT equipment.

In the food stamp coupon system, the cost of the space occupied by coupons in the cash drawer would be analogous to EBT equipment space cost. Because there is no verifiable way of measuring the value of cash drawer

¹William L. Hamilton, et al., op. cit. p. 155.

space, however, EBT space costs in this section are presented without comparable coupon costs.

METHODOLOGY

The cost of EBT equipment space is estimated as the product of the total amount of occupied space and the unit cost of that space. The total amount of space occupied by EBT store equipment can be viewed several ways. First, because the actual dimensions of the equipment amount to slightly more than one square foot, total square feet of space can be approximated by the number of equipment stations. This approach was rejected because it fails to account for the way the equipment is configured. For example, the amount of space devoted to EBT is less if the printer is stacked on top of the terminal rather than side by side. To account for this factor, the analysis is based on retailer estimates of space used by EBT equipment rather than using a function of the actual pieces of equipment.

Another view of EBT equipment takes into account alternative uses of the space at the checkout counter. If the equipment occupies space with no alternative use, then the opportunity cost of the space is actually zero. To account for this concept, retailers were asked to identify alternative uses for EBT equipment space.

The unit cost of the space is based on data collected from two commercial realtors based in Reading. The estimates are based on the rental value per square foot of Reading store property. These values are \$1.13 per square foot per month for supermarkets, \$1.33 per square foot for convenience stores and \$0.83 per square foot for grocery stores and other stores.

Retailers also provided their own estimate for the unit value of front-end space. Retailers based these estimates on how much they perceived the space to be valued, not necessarily how much the space actually costs. The analysis uses rental value, however, because retailers' perceived values display wide variation and do not represent out-of-pocket expense to the retailers. (The perceived values average \$33.48 per square foot for supermarkets, \$21.60 per square foot for grocery stores, \$70.43 per square foot for convenience stores, and \$7.19 per square foot for other stores. Appendix VC discusses the effect on estimated space costs of using retailers' perceptions of the value of front-end space.)

ESTIMATED EBT EQUIPMENT SPACE COST

The estimated costs of EBT equipment space are presented in Exhibit 5-21. As shown in that exhibit, total cost per \$1,000 of EBT redemptions for all stores averages about \$1.22 per month. However, the measure varies somewhat when viewed by store type, from about \$0.95 (grocery stores) to \$4.05 (other stores).

Much of the variation arises because of differences in total EBT space and total monthly redemptions. Supermarkets, for instance, average about \$1,030 in monthly EBT sales per square foot of occupied space. The comparable numbers for the remaining store types are \$876 for grocery stores, \$525 for convenience stores, and \$205 for other stores. If the rental value of space were the same for all stores, stores' space costs per \$1,000 of redemptions would be directly proportional to monthly EBT sales per terminal.

EBT space cost per \$1,000 redeemed for all stores declines by about 45 percent when accounting for alternate uses for the space. The majority of this decline was contributed by supermarkets, where roughly 25 percent of supermarkets offered no alternative use for space occupied by EBT equipment. Nearly all convenience stores proposed alternate uses for EBT store equipment, thus resulting in little difference between adjusted and total cost measures for this store type. The apparent ready availability of alternative uses for convenience store space is consistent with those stores assigning highest perceived value to the space.

Among those retailers identifying alternative uses for EBT space, most respondents would use the space to house product displays (46.8 percent). Other commonly identified alternative uses include using the space for checkout equipment (13.9 percent) and to display advertisements (7.6 percent).

5.10 CONCLUSIONS

Combining the costs of the eight major components of food stamp participation, EBT participation costs are \$6.60 per \$1,000 of benefits lower than coupon participation costs. This result is an improvement over net EBT cost estimates made during the original demonstration. At that time, EBT

Exhibit 5-21

Space Costs for the EBT System

	MAJOR STORE TYPE				All Stores
	Super-Markets	Grocery Stores	Convenience Stores	Other Stores	
Average cost/square foot	\$1.13	\$0.83	\$1.33	\$0.83	\$0.99
Average square feet/store	13.43	1.69	2.33	3.23	4.48
Full cost per store per month	\$15.18	\$1.41	\$3.10	\$2.68	\$4.79
Adjusted cost per store per month ^a	\$5.90	\$1.12	\$2.91	\$1.98	\$2.58
Full cost per \$1,000 benefits redeemed					
Full Cost	\$1.10	\$0.95	\$2.54	\$4.05	\$1.22
Adjusted Cost	\$0.43	\$0.76	\$2.38	\$2.99	\$0.65

Number of stores	23	52	21	13	109
Average Redemption	\$13,821	\$1,480	\$1,223	\$663	\$3,937
Standard Error ^b					
Full Cost	\$0.33	\$0.06	\$0.71	\$0.92	\$0.28
Adjusted Cost	\$0.11	\$0.07	\$0.72	\$0.78	\$0.10

Notes: ^aAdjusted costs reflect retailer alternative uses for the space. If no alternative is suggested, a zero cost is assumed for the space.

^bMeasures the variation of store cost per \$1,000 of redemptions relative to the sample mean, weighted by redemption volume. See Appendix VB for a discussion of the standard errors and statistical significance.

Sources: Phase C interview data.

participation costs were \$4.52 per \$1,000 of benefits lower than coupon participation costs.

Exhibit 5-22 presents the total costs per \$1,000 of food stamp redemptions under the EBT and coupon systems during the extended demonstration. As shown in that exhibit, retailers' participation costs are \$17.28 per \$1,000 of benefits with the redesigned EBT system and \$23.88 per \$1,000 of coupon redemptions. Handling and reconciliation and checkout productivity are the major cost elements in both systems. Although EBT costs are higher than coupon-related costs in six of the eight cost categories, total EBT costs are lower because of the large savings (\$9.57 per \$1,000 of benefits redeemed) in handling and reconciliation costs.

As shown at the bottom of the exhibit, EBT costs are less than coupon costs for supermarkets and grocery stores (which represent about 75 percent of the stores in the sample and 90 percent of the EBT redemptions). EBT costs exceed coupon costs at convenience stores and other stores.

As with the overall results, handling and reconciliation costs have the major impact on results at the store-type level. For supermarkets and grocery stores, where EBT handling costs are lower than coupon costs, food stamp participation is less costly under an EBT system. At convenience stores and "other store" types, where EBT handling costs are higher than coupon handling costs, EBT participation costs exceed total coupon costs.

Estimated total EBT participation costs per \$1,000 of redeemed benefits are \$3.80 greater during Phase C than were estimated for the original EBT system, as displayed in Exhibit 5-23. Coupon-related participation costs during Phase C are \$6.14 per \$1,000 redeemed greater than during the original demonstration. Thus, even though EBT participation costs increased during Phase C, the estimated savings of EBT over coupon participation costs increases by about \$2.34 (to \$6.86) per \$1,000 in redemptions.

Although the chapter provided some explanation for why EBT- and coupon-related costs vary between Phase C and the original demonstration period, the results often are not consistent with expectations. For instance, handling and reconciliation costs increased in both the EBT and coupon systems. The variation in costs over time may reflect underlying (but unknown) changes in procedures, and slight changes in the sample of stores

Exhibit 5-22

**Summary of Retailer Participation Costs
per \$1,000 of Benefits Redeemed^a**

Cost Component	EBT System		Food Stamp Coupon System	
Checkout Productivity	\$3.39	(\$1.98)	\$3.01	(\$2.05)
Handling	\$9.62		\$19.19	
Ongoing Training	\$0.55		\$0.47	
Reshelving	\$1.83		\$1.01	
Float	\$0.15		\$0.20	
Telephone	\$0.26		\$0.00	
Accounting Error	\$0.26		\$0.00	
Space	\$1.22	(\$0.65)	\$0.00	
	<u> </u>	<u> </u>	<u> </u>	<u> </u>
Total	\$17.28	(\$15.30)	\$23.88	(\$22.92)

Total cost for:				
Supermarkets	\$13.04	(\$11.69)	\$21.95	(\$21.47)
Grocery Stores	\$26.70	(\$23.84)	\$49.58	(\$47.93)
Convenience Stores	\$31.20	(\$24.36)	\$18.74	(\$13.68)
Other Stores ^b	\$53.11	(\$52.05)	\$16.10	(\$16.10)

Notes: ^aAdjusted estimates assuming limited opportunity costs appear in parentheses.

^bExcludes checkout productivity component.

Sources: Phase C observation and interview data.

Comparison of Phase C to Original Demonstration Retailer Participation
Costs per \$1,000 of Benefits Redeemed: All Stores

Cost Component	Original Demonstration			Phase C System ^a		
	EBT	Coupon	Difference	EBT	Coupon	Difference
Checkout Costs	\$3.93	\$3.63	\$0.30	\$3.39	\$3.01	\$0.38
Handling	\$4.69	\$12.93	-\$8.24	\$9.62	\$19.19	-\$9.57
Ongoing Training	\$1.29	\$0.43	\$0.86	\$0.55	\$0.47	\$0.08
Reshelving	\$0.44	\$0.46	-\$0.02	\$1.83	\$1.01	\$0.82
Float	\$0.05	\$0.29	-\$0.24	\$0.15	\$0.20	-\$0.05
Accounting Error	\$0.58	\$0.00	\$0.58	\$0.26	\$0.00	\$0.26
Space	\$2.24	\$0.00	\$2.24	\$1.22	\$0.00	\$1.22
	=====	=====	=====	=====	=====	=====
Total	\$13.22	\$17.74	-\$4.52	\$17.02	\$23.88	-\$6.86

Total cost for:						
Supermarkets	\$9.37	\$9.46	-\$0.09	\$13.04	\$21.95	-\$8.91
Grocery Stores	\$16.06	\$22.83	-\$6.77	\$25.19	\$49.58	-\$24.39
Convenience Stores	\$50.28	\$49.87	\$0.41	\$31.20	\$18.74	\$12.46

Note: ^aPhase C costs exclude telephone costs for comparability to the original analyses.

Sources: Phase C and Late (original) Demonstration observation and interview data.

interviewed may have contributed somewhat to the differences. It is also possible that retailers' participation costs display natural variation from month to month. In the absence of a comparison group of non-demonstration retailers, it is not possible to test this latter hypothesis.

The possible explanations for changes in participation costs over time do not affect the comparison of EBT and coupon costs during Phase C. All Phase C cost data (except data on checkout times) were collected from the same sample of retailers at the same time. Thus, the evidence that participation costs are lower under the EBT system than the coupon system is strong.

Finally, despite the increase in estimated participation costs under the redesigned EBT system (relative to the original EBT system), the redesigned system enjoys strong support among participating food retailers. Approximately 70 percent of retailers prefer the Phase C system to the food stamp coupon system, and 75 percent prefer some electronic system to a paper coupon system. Barring any serious departure from the level of system operations Reading food retailers have come to expect, the EBT system will likely continue to enjoy strong support from the retailer community.

Chapter Six

EFFECTS OF THE EBT SYSTEM ON FOOD STAMP RECIPIENTS

When the original EBT demonstration was proposed, the Food and Nutrition Service and client advocacy groups had several concerns about possible adverse effects of the new system on recipients. If recipients had difficulty using the system, or if the system increased recipients' time and out-of-pocket costs of participating in the Food Stamp Program, these problems would represent a serious obstacle to further efforts to implement EBT systems.

The Reading EBT demonstration largely dispelled these concerns. The evaluation of the demonstration found that an overwhelming majority of food stamp recipients preferred the EBT system to the coupon system it replaced, and recipients found the EBT system easier to use than coupons. In addition, recipients reported spending less time and money dealing with the EBT system than with the coupon system.¹

Given recipients' very favorable response to the original EBT system, concerns over system impacts on recipients were not a major issue when FNS agreed to extend the Reading EBT demonstration. Both FNS and PDPW, however, wanted to make sure that neither the transfer of system operations to PDPW during Phase B nor the introduction of a redesigned EBT system in Phase C caused problems for recipients. The Pennsylvania Department of Public Welfare, therefore, made every effort to ensure that the Phase B and Phase C EBT systems continued to provide good service to recipients. The local welfare office maintained its training procedures for new recipients, a feature of the original demonstration that undoubtedly contributed to how easily recipients learned to use the system. In addition, when PDPW redesigned the EBT system for Phase C, a major design objective was to avoid introducing any procedural changes in how recipients were to use the system. System designers met this objective with one minor exception: the balance-only terminals in the original system were modified to allow the use of separate PIN pads.

¹William L. Hamilton et al., op. cit., p. 215.

KEY HYPOTHESES

Despite PDPW's efforts to minimize recipients' problems with the Phase B and Phase C EBT systems, the possibility existed that unforeseen problems could develop. Such problems were particularly possible during Phase C of the extended demonstration, because the complete redesign of the system's hardware and software introduced the possibility of processing errors, system downtime, and even the potential for complete system failure. Problems with store terminals and printers also could increase during the extended demonstration as the equipment aged. (Much of the equipment was first installed late in 1984.) Any of these potential problems could increase recipients' participation costs or change recipients' attitudes about the system.

Accordingly, the key issues in the evaluation of system impacts on recipients during the extended demonstration are:

- 1) Have recipients' attitudes about the EBT system changed with the introduction of the redesigned system?
- 2) Has any change occurred in the nature or frequency with which recipients experience problems with the system?
- 3) Have recipients' costs of participating in the EBT system changed with the introduction of the redesigned

It is important to note that these issues reflect a major shift in the focus of the evaluation of system impacts on recipients. Rather than comparing recipients' experiences with the EBT and coupon systems, the evaluation compares recipients' experiences with the original and redesigned EBT systems.

RESEARCH STRATEGY

Because PDPW's assumption of system operating responsibilities and the introduction of the redesigned EBT system were expected to have little effect on food stamp recipients in Reading, the evaluation's research design included only a series of monitoring surveys with a small sample of recipients. In addition to providing data for the evaluation of system impacts, the monitoring surveys were meant to provide FNS and PDPW with rapid feedback on changes in recipients' attitudes about or problems with the EBT system. Two focus group sessions also were held to further explore recipients' attitudes about the EBT system.

A total of five monitoring surveys was conducted with recipients throughout the extended demonstration. Two surveys were conducted during Phase B and three surveys were conducted during Phase C. The first four surveys were longitudinal in design, so that changes in recipient attitudes and the frequency of problems could be more readily identified. If respondents indicated a change in their attitudes about the system, the interviews concentrated on eliciting reasons for the change. The fifth survey wave included only recipients brought onto the EBT system during the geographic expansion of the EBT caseload in 1988. This survey measured the frequency of problems with the system among new demonstration participants and assessed their level of satisfaction with the training they received in how to use the EBT system.

Estimating recipients' cost of participation in the Food Stamp Program requires the collection of a large amount of data -- too much data to be obtained during a short monitoring survey. The surveys, therefore, did not collect data allowing the estimation of participation costs. If the surveys had indicated that recipients were having greater difficulties with the EBT system than during the original demonstration, a large-scale survey to measure participation costs would have been considered by FNS. Because the monitoring surveys did not indicate an increase in recipient problems, no large-scale survey was conducted.

Exhibit 6-1 presents information on each of the surveys, which are identified as Waves 1 through 5 in the exhibit and throughout the chapter. This exhibit shows the dates of the surveys, the number of respondents in each survey wave, and information about the characteristics of survey respondents. The first sample of recipients (Wave 1) was selected randomly from the EBT demonstration caseload. For each subsequent wave except Wave 5, the respondents to the previous wave were re-interviewed if they were still receiving food stamps. Replacements for terminated households were drawn randomly from the then-current demonstration caseload to complete the sample. In Wave 5, an entirely new sample of recipients was selected randomly from the demonstration households brought onto the EBT system during the caseload expansion.

The percentage of survey respondents by ethnic group varies somewhat across the survey waves, as shown in Exhibit 6-1. This variation may be

Exhibit 6-1

Description of the Five Waves of Recipient Interviews

Characteristic	Phase B		Phase C		
	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5
Date of survey	Oct 86- Dec 86	Feb 87- Apr 87	Sept 87- Dec 87	May 88- July 88	Nov 88- Feb 89
Number of respondents	29	29	22	31	30
Percentage of respondents who previously used food stamp coupons	79.3	82.8	86.4	80.6	83.3
Average size of household	3.0	3.1	3.3	3.1	3.1
% white	48.3	48.3	50.0	48.4	33.3
% hispanic	44.8	44.8	36.4	32.3	53.3
% black	6.9	6.9	9.1	19.4	13.3
% female	89.7	96.6	100.0	86.2	83.3
% age 60 or more	20.7	20.7	22.7	19.4	16.7

partly due to the small sample sizes. The largest difference is the substantially higher percentage of Hispanics in Wave 5. The apparent reason is that the expansion caseload included recipients in a housing project that, according to BCAO personnel, is largely Hispanic.

The two focus group sessions were held to provide further insight into how recipients interact with the EBT system and to explore recipients' attitudes towards the EBT system in greater depth. The focus groups discussed what recipients liked and disliked about the EBT system and what problems they had encountered with it. Thirteen recipients participated in the focus groups. The discussions provided information very similar to the monitoring surveys and, in effect, added further support to the findings of the surveys. The information obtained from the focus groups is used to supplement the discussion of the monitoring survey results in this chapter.

HIGHLIGHTS

Food stamp recipients in the extended demonstration continued to overwhelmingly prefer the EBT system to the ATP/coupon system. The majority of recipients found the EBT card easier to use for shopping than food stamp coupons. Even among the elderly and non-English speakers, the majority of respondents preferred the EBT system and found it easier to use than coupons.

Evidence from the monitoring surveys suggests that recipient participation costs changed little in Phase C from levels estimated during the original demonstration. The frequency of problems reported by recipients was about the same in Phase C as in the original demonstration. While the number of trips by recipients to obtain new or replacement EBT cards did increase slightly in Phase C, this increase added only about one cent per case month to the estimated direct costs of participation. Recipients' cost of participation in the Phase C EBT system remained considerably lower than the cost of participation in the ATP/coupon system.

ORGANIZATION OF THIS CHAPTER

The next section presents evidence concerning recipients' ease of use of the EBT system during the extended demonstration. In Section 6.2, the preferences of recipients for the EBT system versus the coupon system, and the reasons for their preferences, are discussed. Section 6.3 identifies the most

common problems encountered by recipients during the extended demonstration compared with the original EBT demonstration. Recipients' participation costs are discussed in Section 6.4. Section 6.5 summarizes the findings on the impacts of the extended demonstration on food stamp recipients.

6.1 RECIPIENTS' EXPERIENCES USING THE EBT SYSTEM

Compared with the original demonstration, the procedures and equipment used in the extended demonstration changed very little from the perspective of recipients. Other than separate PIN pads at the balance-only terminals, no system changes were readily apparent to recipients when they checked their balances or used their EBT cards to buy groceries. This section compares the experience of recipients in learning about and using the EBT system during the original and extended demonstrations.

LEARNING THE EBT SYSTEM

One important influence on recipients' acceptance and ease of use of the EBT system is the quality of the training they receive on how to use the system. Training of new recipients is done by employees of the Berks County Assistance Office (BCAO). The training procedures for recipients were not substantially changed during the extended demonstration, reflecting the high level of satisfaction with the training of recipients in the original demonstration.

The monitoring surveys indicated that nearly all of the recipients were satisfied with the training given by the BCAO. In survey Waves 1-4, respondents were asked about their EBT training if they had received their EBT card within the past six months. Of these respondents, 96 percent reported being very satisfied with the training and the rest were "somewhat satisfied." In Wave 5, all respondents were asked about their training because all were brought into the EBT demonstration during system expansion. Eighty percent were very satisfied with the training, and 17 percent were somewhat satisfied. One person (3 percent) reported being dissatisfied with the EBT training but gave no reason for her response.

The recipients' positive assessment of their EBT training during the extended demonstration is similar to the assessment given by recipients in the original demonstration. Approximately 70 percent of recipients reported being

very satisfied with training, and only 5 percent reported being dissatisfied.¹ Clear and comprehensive training for recipients in how to use the EBT system in both the original and extended demonstrations probably contributed to recipients' high rate of acceptance of the EBT system.

REMEMBERING ONE'S PIN

The personal identification number, or PIN, is intended to prevent unauthorized use of the recipient's EBT card. During training, recipients select their own 4-character PINs and are instructed on the importance of keeping them secret.

There was concern prior to the original demonstration that recipients might have difficulty remembering their PINs. Evidence from the original demonstration indicates, however, that remembering the PIN was not a problem for recipients. Only about 7 percent of survey respondents in the original demonstration reported ever forgetting their PINs, and only one respondent needed to get a new PIN after forgetting it.²

The monitoring surveys found that remembering the PIN also was not a major problem for recipients during the extended demonstration. In Phase B, none of the respondents reported forgetting their PINs. In the Phase C surveys, between 0 and 7 percent of respondents reported forgetting their PINs once in the 3 months prior to the survey wave. Only one of these respondents considered forgetting the PIN to be a "big problem." These results indicate that, as in the original demonstration, remembering the PIN does not cause much difficulty for recipients.

KEEPING TRACK OF ACCOUNT BALANCES

In the coupon system, knowing one's food stamp account balance is simply a matter of counting the coupons not yet spent. In the EBT system, recipients cannot see their benefits, but they can determine the amount of benefits left in their accounts in several ways. The recipient's remaining account balance is printed on every EBT purchase receipt. Recipients can also

¹Ibid., p. 187.

²Ibid., p. 188.

use their EBT cards to learn their balances at a balance-only terminal or a POS terminal in a store. Finally, recipients can use touch-tone phones to call the EBT system's computer to receive balance information, after keying in their case numbers and PINs.

Most recipients rely on the balance information on their receipts to keep track of their food stamp account balances. Exhibit 6-2 shows the multiple ways in which the survey respondents track their balances. In all of the survey waves, 86 percent or more of the respondents reported tracking their account balances by using their receipts. While recipients may use more than one method to track their balances, 75 percent or more in each wave said that keeping receipts is the main (or only) way they keep track of their balances.

Few respondents to the monitoring surveys reported having difficulty keeping track of their food stamp account balances. In fact, a majority of respondents in all waves (who had previously used coupons) found keeping track of their balances easier with the EBT system than with coupons. In Phase B, an average of 72 percent of the respondents agreed with the statement: "It's easier to know how much you have left with (EBT) cards than with coupons," while less than 9 percent disagreed with the statement. In the Phase C surveys, between 44 and 68 percent of respondents agreed that keeping track of benefits is easier with the EBT system than with coupons, while between 4 and 10 percent disagreed. The percentage who neither agreed nor disagreed increased to 52 percent in Wave 5, considerably more than in earlier surveys. Recalling that the Wave 5 respondents were new to the system, this suggests that there may be a learning curve associated with the length of time using the EBT system.

SHOPPING PATTERNS

The monitoring surveys asked recipients a number of questions about shopping with the EBT card to ensure that the Phase B and Phase C systems did not cause recipients to change their shopping patterns. Recipients were asked about who shops using the EBT card, how frequently the card is used, and treatment by store clerks when using the EBT card.

Few of the survey respondents during the extended demonstration reported making a change in who does the shopping with the EBT card, compared

Exhibit 6-2

**Mechanisms for Keeping Track of Account Balances
on the EBT System**

Mechanism	Percentage of Respondents Using Mechanism				
	Phase B		Phase C		
	Wave 1	Wave 2	3	Wave 4	5
Keep receipt showing food stamp balance	86.2	93.0	95.5	93.5	100.0
Use balance-only terminal in store	31.0	34.5	22.7	22.6	6.7
Use POS terminal in store	10.3	27.6	22.7	22.6	20.0
Call from home phone	10.3	6.9	18.2	16.1	6.7
Call from another phone	0.0	0.0	0.0	13.0	0.0
Other	17.2	3.4	0.0	32.3	0.0

Note: Percentages may sum to more than 100 percent because of multiple responses.

with who did the shopping with coupons. In Phase B, an average of 87 percent of respondents reported no change in who shops with food stamp benefits using the EBT card. Between 95 and 100 percent of respondents to the Phase C surveys reported no change in shopper. These results are similar to the findings of the original demonstration and suggest that the EBT system has not caused recipients to make a change in who does their food stamp shopping.

Survey respondents were also asked to report how many times they use the EBT card to buy groceries in a typical month. Respondents reported shopping more frequently with the EBT card during the extended demonstration than in the original demonstration. In the original demonstration, about 44 percent of respondents reported shopping only once a month with EBT. In contrast, the monitoring surveys found that between 23 and 35 percent of respondents reported shopping just once a month. While only about 11 percent reported shopping more than once a week with the EBT card in the original demonstration, the percentage of respondents who reported shopping more often than once a week with the EBT card during the extended demonstration ranged from 17 to 36 percent in the 5 survey waves.

There was no system change in the extended demonstration that would have required recipients to shop more frequently than during the original demonstration (or to shop more frequently than with coupons). The reported number of shopping trips may be higher in the monitoring surveys because respondents were specifically asked to count shopping trips in which only a few items were purchased.

Even in the monitoring surveys, however, recipients' responses may understate the monthly number of purchases using the EBT card. The reported average number of purchases per month using the EBT card ranged from 3 to 6 in the five survey waves of the extended demonstration. Yet, the average number of purchases made per household during Phase C was 7.8 purchases per month (based on system data from July 1987 - September 1988).¹ Respondents may understate the number of times per month that they use coupons or the EBT card because they do not remember all the small shopping trips taken, or all the purchases made during a trip.

¹Evidence from the original demonstration's system data suggests that the average number of card uses was in the range of 7 to 9 transactions per month.

The monitoring surveys also asked respondents who had previously used coupons whether they believed they were treated better when using the EBT card than when using food stamp coupons. Their responses suggest that recipients do perceive a slight reduction in the stigma associated with using food stamps when using the EBT card. Exhibit 6-3 shows the percentage of respondents in each survey wave that agreed or disagreed with the statement: "People treat you better when you pay with the (EBT) card than when you use (food stamp) coupons." In most of the survey waves, more respondents agreed than disagreed that they were treated better when using the EBT card than coupons. In Waves 2 and 3, over 50 percent of respondents agreed with the statement. In Wave 5 however, only 16 percent agreed. Most Wave 5 respondents (72 percent) neither agreed nor disagreed and only 12 percent disagreed. Factors contributing to this difference in perceptions could be length of time using the system (Wave 5 respondents had been using the system for fewer months, on average, than other households in the demonstration area) or possibly perceptions of racial discrimination. As was shown in Exhibit 6-1, the Wave 5 sample included a higher percentage of minority households than earlier waves.

6.2 RECIPIENTS' OPINIONS ABOUT THE ISSUANCE SYSTEMS

The most direct comparison of the impacts of the EBT and coupon systems on recipients can be obtained from recipients who have used both systems. For those survey respondents who had previously used food stamp coupons, the monitoring surveys asked whether the respondents preferred the EBT system or the coupon system. These respondents also were asked whether it is easier or harder to do food shopping with the EBT card compared with coupons.

SYSTEM PREFERENCE

When recipients who have previously used food stamp coupons are asked to compare the two systems, most indicate that they prefer the EBT system. Exhibit 6-4 shows the percentages of respondents preferring either the EBT system or coupons in the original and extended EBT demonstrations. Near the end of the original demonstration, over 77 percent of survey respondents expressed a preference for the EBT system. Only 17 percent of the

Exhibit 6-3

**Recipients' Perception of Treatment
When Using EBT Card Versus Coupons^a**

Percentage of Respondents Who:	Phase B		Phase C		
	Wave		Wave		
	1	2	3	4	5
Agree	39.1	54.2	52.6	32.0	16.0
Disagree	8.7	12.5	15.8	12.0	12.0
Neither agree nor disagree	30.4	25.0	15.8	52.0	72.0
Don't know	21.7	8.3	15.8	4.0	0.0
(N)	(23)	(24)	(19)	(25)	(25)

Note: ^aRespondents were asked whether they agree or disagree with the statement:
"People treat you better when you pay with the (EBT) card than when you
use (food stamp) coupons."

Exhibit 6-4

Which System is Preferred by Recipients

Percentage Preferring:	Original Demonstration Period ^a	Phase B		Phase C		
		Wave		Wave		
		1	2	3	4	5
EBT system	77.4	78.3	87.5	94.7	72.0	76.0
Coupon system	16.7	13.0	12.5	5.3	20.0	8.0
Don't know	5.9	8.7	0.0	0.0	8.0	16.0
(N)	(221)	(23)	(24)	(19)	(25)	(25)

Note: ^aResponses of EBT participants interviewed late in the original demonstration period (August and September of 1985).

recipients preferred the coupon system. The results were very similar during both phases of the extended demonstration.¹ A large majority preferred EBT over coupons in all monitoring waves. In each wave, 20 percent of respondents or fewer preferred coupons.

Respondents also were asked to identify the reasons for their preference for the EBT system or for coupons (multiple responses were allowed). Respondents' stated reasons for preferring one system or the other are presented in Exhibit 6-5. During the extended demonstration, recipients preferring the EBT system most often said that it was more convenient, that there was less chance of loss or theft of benefits, and that it was quicker or easier at the checkout counter. In Wave 5, however, many respondents (about half) did not provide a reason for why they prefer the EBT system.

The reasons given by respondents who prefer the EBT system were fairly similar in the extended and original demonstrations. Respondents generally emphasized the greater convenience of the EBT system (e.g., easier to use, less hassle than coupon books), and the increased security of benefits. Although no respondents during the original demonstration said that the EBT system was "more convenient" (a common response during the extended demonstration), many of the reasons that were stated are related to the general convenience of the system.

Of the 5 to 20 percent of respondents in each monitoring survey who preferred the coupon system to the EBT system, most stated either that coupons were more convenient for them, or that it was easier to track balances or quicker at the checkout with coupons. These reasons were similar to the reasons given by coupon preferrers in the original demonstration.

¹Significance tests for differences in responses between the original and extended demonstrations have not been done. Unless adjustments are made for the multiplicity of tests, the significance levels for individual comparisons would be misleading. The monitoring surveys included only small samples of recipients and were not intended to replicate the detail or level of precision of the original demonstration survey of recipients. Thus, comparison of results from the original demonstration and monitoring surveys throughout this chapter should be viewed as suggestive evidence of differences (or the lack of differences) in responses between the original and extended demonstrations.

Exhibit 6-5

Percentage of Respondents Citing Specific Reasons
for System Preference^a

Reasons Cited	Original Demonstration Period ^b	Phase B Wave		Phase C Wave		
		1	2	3	4	5
<u>Prefer EBT</u>						
More convenient	0.0	44.4	19.0	22.2	44.4	15.8
Quicker or easier at checkout	38.8	27.8	19.0	11.1	11.1	5.3
Less chance of loss or theft	21.3	33.3	33.3	50.0	11.1	21.1
No need to go to the bank	17.5	0.0	4.8	5.6	0.0	5.3
Less cumbersome and hassle	13.8	0.0	23.8	5.6	11.1	10.5
Less chance of fraud	6.3	5.6	9.5	5.6	16.7	5.3
Easier to track balance	0.0	11.1	0.0	0.0	0.0	5.3
Other	2.5 ^c	11.1	4.8	5.6	11.1	5.3
Don't know or no response	--	11.1	19.0	27.8	5.6	52.6
(N)	(160)	(18)	(21)	(18)	(18)	(19)
<u>Prefer Coupon</u>						
More convenient	0.0	33.3	0.0	0.0	40.0	0.0
Quicker or easier at checkout	44.2	0.0	0.0	0.0	20.0	50.0
Familiarity	11.6	0.0	0.0	0.0	0.0	0.0
Easier to track balance	11.6	66.7	0.0	0.0	0.0	0.0
Get cash change	9.3	0.0	33.3	0.0	0.0	0.0
Other	23.3 ^c	100.0	0.0	0.0	0.0	50.0
Don't know or no response	--	0.0	66.7	100.0	40.0	0.0
(N)	(43)	(3)	(3)	(1)	(5)	(2)

Notes: ^aPercentages sum to more than 100 percent because multiple responses were allowed.

^bResponses of EBT participants interviewed late in the original demonstration period (August and September of 1985).

^cNo response was not tabulated separately from "other" in the original demonstration.

Most of the participants in the focus group sessions also preferred the EBT system over coupons. Several cited the greater security of the card compared with coupons as its major advantage. Others commented that the EBT card was easier to use, handier, or easier to carry than coupon books. One focus group participant who preferred coupons, however, liked having coupons in hand so that she could quickly know when her benefits were exhausted.

Over the first four survey waves (when the same respondents were being reinterviewed), two respondents switched from preferring the coupon system to preferring the EBT system, citing the ease of carrying the card and card security as the reasons for the change. One respondent who earlier had expressed no preference changed to preferring the EBT system.

Respondents who had used food stamp coupons prior to using the EBT system were also asked whether shopping with the EBT card was harder or easier than with coupons. Exhibit 6-6 shows the percentage of respondents who found EBT shopping "easier", "harder", or "about the same" as shopping with food stamp coupons. The results suggest that most respondents continue to find shopping with the EBT card easier than shopping with coupons. Less than 13 percent of the respondents in each wave reported that shopping is more difficult with EBT than with coupons.

The results of the fifth monitoring wave were somewhat different from earlier waves. The percentage of respondents who found shopping with EBT easier than with coupons was lower than in the earlier waves, yet the percentage that found shopping harder with EBT than with coupons also remained fairly low. In Wave 5, a larger percentage of respondents (44 percent) said that shopping with EBT was about the same as shopping with coupons. The Wave 5 respondents, it has been noted, were from the expansion area and were likely to have been using the EBT system for less time on average than respondents in the earlier survey waves.

The responses of recipients who had been interviewed in earlier monitoring waves were compared with their previous responses to determine whether any had changed their assessments of the ease of shopping with EBT compared with coupons. Two respondents changed from finding the EBT system harder to finding it easier than coupons. One respondent, who did not have a preference in the previous survey, now found coupons easier. These few respondents did not give a reason for their changes in opinion. The vast

Exhibit 6-6

Ease of Food Shopping Under EBT and Coupon Systems

Percentage of respondents who said that food shopping using EBT is:	Original Demonstration Period ^a	Phase B		Phase C		
		Wave		Wave		
		1	2	3	4	5
Easier	58.5	73.9	83.3	89.5	68.0	44.0
Harder	11.2	0.0	12.5	5.3	4.0	12.0
About the same	30.4	26.1	4.2	5.3	28.0	44.0
(N)	(224)	(23)	(24)	(19)	(25)	(25)

Notes: ^aResponses of EBT participants interviewed late in the original demonstration period (August and September of 1985).

majority of respondents were consistent in their preferences from one survey to the next, suggesting that no major changes in system problems or procedures occurred to alter their opinions.

Prior to implementation of the demonstration EBT system some of the concern about possible impacts on recipients focused on particular subgroups of the recipient population, such as the elderly or non-English speakers, who might have more difficulty with the new system than other recipients. There are few indications from the monitoring surveys, however, that these subgroups varied much in their acceptance or ease of use of the EBT system during the extended demonstration.

As shown in Exhibit 6-7, the percentage of respondents preferring the EBT system to coupons varied little by primary language or age group. From 63 to 88 percent of non-English speakers preferred the EBT system, while the comparable range across survey waves for English speakers was 75 to 100 percent. Similarly, system preference varied little by age group.

The percentage of respondents who found shopping easier with the EBT card also is similar for those who speak English and those whose primary language is not English. From 50 to 88 percent of non-English speakers in each survey wave reported shopping to be easier with EBT than with coupons, compared to 42 to 91 percent of English-speaking respondents. Finally, while the percentage of elderly respondents who found shopping easier with the EBT system displayed more variation across survey waves (20 to 100 percent) than among non-elderly respondents (50 to 87 percent), there is no evidence of systematic differences among age groups.

Overall, the results of the monitoring surveys indicate that recipients continue to prefer the EBT system over coupons and find it easier to use. As in the original demonstration, there appears to be little difference between various subgroups of recipients in terms of their system preference or ease of use of the EBT system.

6.3 RECIPIENTS' PROBLEMS WITH THE EBT SYSTEM

Food stamp recipients who use the EBT system to buy groceries might experience a number of different problems with the system. Some problems relate to proper procedures for using the system. Examples of procedural

Exhibit 6-7

System Preference and Ease of Shopping,
by Primary Language and Age Group

Subgroup	Percentage ^a of respondents who prefer:	
	EBT System	Coupons
English	75-100	0-19
Other Language ^b	63-88	0-25
Under 60	68-93	5-21
60 and over	60-100	0-20

Subgroup	Percentage ^a of respondents who find shopping easier with:	
	EBT System	Coupons
English	42-91	0-16
Other Language ^b	50-88	0-20
Under 60	50-87	0-11
60 and over	20-100	0-20

problems include forgetting one's personal identification number (PIN) and not being able to keep track of one's remaining balance of benefits. Other problems reflect the improper functioning of the system or the stores' EBT equipment, such as slow response times at checkout counters, malfunctioning terminals or printers, and total system failure. Finally, other potential problems include lost, stolen or damaged EBT cards; benefits that are credited late or in the wrong amount to recipients' accounts; and errors in the debiting of purchases or the crediting of refunds to recipients' accounts.

As discussed in Chapter 5, the evaluation's monitoring of system operations during the extended demonstration identified a number of system problems affecting portions of the food stamp caseload. The major system problems of Phase B and Phase C were presented in Exhibit 5-2. Most of the system problems shown were periods of system downtime.

In addition to system downtime, transaction reversals (discussed in Chapter 5) can be an inconvenience to recipients. A transaction reversal occurs when the EBT system does not complete transaction processing. If the reversal is noticed by the cashier, the transaction is retransmitted, so the recipient must wait longer than usual for the transaction to be completed. If the store clerk and recipient do not notice that a transaction has been reversed, the store will not receive credit for the recipient's EBT purchase. Once the problem is identified, the recipient will have to return to the store or go to the welfare office to correct the account balance. The BCAO notifies one to two recipients per week, on average, to return to the store or come to the office to complete a reversed transaction.

The problems noted above and in Exhibit 5-2 are not unique to the Phase B or Phase C EBT systems. Similar problems occurred during the original EBT demonstration. To determine whether recipients were experiencing more system problems during the extended demonstration than during the original demonstration, the monitoring surveys asked recipients a lengthy series of questions about any problems they had recently experienced with the EBT system. Exhibit 6-8 presents the average number of problems per month reported by each recipient during each wave of the survey. It also presents respondents' perceptions of whether they were experiencing "more" or "fewer" problems than during earlier periods.

Exhibit 6-8

Frequency of Reported Problems

Reported Frequency	Original Demonstration Period ^a	Phase B Wave		Phase C Wave		
		1	2	3	4	5 ^d
Average number of problems per household per month	0.34	0.81	0.71	0.24	0.39	0.44
(N)	(286)	(29)	(29)	(22)	(31)	(30)
Percentage of respondents reporting ^b						
More problems	NA	4.2	4.0	4.8	6.9	0.0
Fewer problems	NA	4.2	8.0	19.0	27.6	27.6
No change in frequency	NA	91.7	88.0	76.2	65.5	72.4
(N) ^c	(0)	(24)	(25)	(21)	(29)	(29)

Notes: ^aResponses of EBT participants interviewed late in the original demonstration period (August and September of 1985).

^bQuestion was not asked during original demonstration period.

^cExcludes those who gave no response.

^dThe Wave 5 respondents were drawn from households in the EBT system expansion area and thus may have been using the EBT system for a shorter length of time on average than respondents in previous waves. The Wave 5 respondents had been using the EBT card for at least 3 months at the time of the survey.

Based on the figures in Exhibit 6-8, recipients reported experiencing an average of 0.75 problems per month during Phase B (the weighted average from Waves 1 and 2). During Phase C, recipients reported between 0.24 and 0.44 problems per month in each survey wave, or an average of 0.37 problems per household per month.¹ In the original demonstration, recipients reported experiencing problems at a similar rate -- 0.34 problems per household per month.

When asked whether they were encountering more or fewer problems than before, more respondents in each wave reported "fewer problems" than "more problems." This occurred even during the Phase B surveys, when a direct count of problems reported by recipients indicates a greater number of problems. In the Phase B surveys, only about 4 percent of respondents reported experiencing "more" problems compared with the original demonstration. A large majority, about 90 percent of respondents, reported no change in the frequency of problems with the Phase B EBT system compared with the original demonstration.

The discrepancy between respondent reports of the number of problems experienced and their perception of the frequency of problems in Phase B compared with the original demonstration may be due to the length of the recall period in the earlier survey. During the last recipient interview of the original demonstration period, recipients were queried about what problems they had ever experienced with the EBT system and the number of occurrences of each problem. The average recall period for the sample was 7.6 months. The recall period for the Phase B monitoring surveys was two months. The lower rate of reported problems during the original demonstration period, therefore, may reflect an undercount of actual problems due to the lengthy recall period of the survey.

Recall periods in Phase C were similar to those of Phase B, and respondents tended to report fewer problems. In Wave 3, respondents were

¹The Wave 5 sample is not representative of the entire demonstration population in terms of length of time using the EBT system; households in the expansion area are likely to have been using the EBT system for a shorter time period, on average. Nonetheless, when the Wave 5 responses are combined with the responses of the Wave 3 and 4 respondents, the Phase C "average" provides a reasonable representation of the experiences of the EBT population.

asked to compare their experience with the redesigned system with the frequency of problems prior to the June 22, 1987 startup of the Phase C system. Five percent of Wave 3 respondents reported more problems in the four months since the Phase C startup compared with Phase B. Most Wave 3 respondents (76 percent) reported no change in the frequency of problems between the two systems, and 19 percent reported fewer problems.

In Waves 4 and 5 (during Phase C), respondents were asked to assess the change in the frequency of problems over the three months prior to the survey.¹ In both waves, nearly 28 percent reported fewer problems over the three-month period. However, most respondents indicated no change in the frequency of problems during the Phase C demonstration.

Exhibit 6-9 shows the percentage of survey respondents reporting specific types of problems. Respondents were asked whether they had experienced a particular problem (such as forgetting the PIN or losing a card) during the previous several months. During Phase B, the most commonly reported problems were slow response times, system or equipment not working, trouble determining balances, and damaged EBT cards.

In Phase C, respondents reported similar experiences with problems with the EBT system. Fewer respondents in Phase C, however, reported having trouble determining their balance than in Phase B. Somewhat surprisingly, a larger percentage reported problems with late benefits in Phase C, close to 10 percent on average. Although these recipients evidently perceived that their benefits were credited late, no issuance delays actually occurred during Phase C. In Wave 5, none of the respondents reported problems with damaged cards (reflecting the fact that these respondents tended to be relatively new to the EBT system and the likelihood of damage is lower for new cards).

During the latter part of the original demonstration, 52 percent of survey respondents reported no problems with the EBT system. The results of the monitoring surveys in Phases B and C of the extended demonstration are similar (see Exhibit 6-9). The percentage of respondents reporting no problems with the EBT system ranged from 40 to 60 percent in the extended

¹As noted earlier, Wave 5 respondents may have been using the EBT system for a shorter time, on average, compared with respondents from earlier waves. All Wave 5 respondents, however, had been using the EBT system for at least 3 months at the time of the interview.

Exhibit 6-9

**Percentage of Recipients Reporting Problems
with the EBT System**

Types of Problems	Original Demonstration Period ^a	Phase B Wave		Phase C Wave		
		1	2	3	4	5
<u>Problems getting benefits</u>						
Received late	5.9	0.0	6.9	9.1	12.9	6.7
Less than expected	2.1	6.9	0.0	0.0	0.0	0.0
More than expected	1.0	0.0	0.0	0.0	0.0	3.3
<u>Problems with card^b</u>						
Stolen	1.4	0.0	0.0	0.0	0.0	0.0
Lost	7.7	6.9	3.4	0.0	9.7	0.0
Damaged	12.2	10.3	13.8	4.5	19.4	0.0
<u>Other Problems</u>						
Less in account than expected	5.6	3.4	3.4	4.5	0.0	10.0
Couldn't determine balance	9.8	17.2	10.3	13.6	6.5	3.3
Forgot PIN	6.6	0.0	0.0	0.0	6.5	3.3
System slow	40.9	20.7	31.0	27.3	22.6	36.7
System or equipment not working	25.2	13.8	6.9	9.1	16.1	10.0
<u>No problems reported</u>	52.4	41.4	48.3	59.1	41.9	40.0
(N)	(286)	(29)	(29)	(22)	(31)	(30)

Notes: ^aResponses of EBT participants interviewed late in the original demonstration period (August and September of 1985).

^bData on card replacement rates from the BCAO are discussed in Chapter 3. On a per-case-month basis, recipients reported in most survey waves a higher frequency of lost and damaged cards in most survey waves than reported by BCAO. The difference may be due to reporting error (due to the length of recall) or due to sampling error.

demonstration. Overall, slightly less than half of the respondents typically reported no problems with the EBT system in the several months prior to the survey.

The monitoring surveys also show no evidence that elderly or non-English speaking recipients experienced problems with the EBT system at a rate greater than other recipients. The average number of reported problem incidents was lower for non-English speakers than for English speakers in all survey waves. Elderly recipients (aged 60 and over) also reported fewer problems (per respondent) than recipients under age 60. These results accord with the findings of the original demonstration surveys, in which elderly and non-English speaking recipients did not report a higher-than-average incidence of problems with the EBT system.

One focus group participant suggested that elderly recipients liked the EBT system less than the coupon system, noting that elderly recipients have trouble remembering EBT account balances, even if they recently checked the balance by phone or terminal. She also noted that elderly recipients had difficulty in learning the new system. Her concerns, however, are not consistent with the frequency of problems reported by elderly respondents in the monitoring surveys. As discussed, the surveys indicate that the majority of elderly respondents prefer the EBT system to coupons and they report fewer problems with the EBT system than do non-elderly recipients.

The focus group participants discussed a few problems with the EBT system that were not emphasized in the monitoring surveys. There was general agreement among the participants that many food store cashiers receive insufficient training and that some store cashiers are "trained" by the first recipient who hands them an EBT card, especially in smaller stores. Also, in one group, none of the participants had ever used a telephone to check their balance; one participant was unaware of the service, another did not know the phone number. Focus group participants also complained that they want to shop with their food stamp benefits in some stores that do not accept the EBT card, although the stores mentioned are mostly outside the demonstration area.

Several of the focus group participants felt that the system could be improved by providing faster transaction times, which would lessen recipients' wait and reduce the complaints they hear (or sense) from other

customers and cashiers. Despite these comments, many respondents to the monitoring surveys felt that paying for groceries is faster with the EBT card than with food stamp coupons. Exhibit 6-10 shows the percentage of respondents in each wave that agreed or disagreed with the statement: "It's quicker to pay for groceries with coupons than with (EBT) cards." Overall, the majority of respondents in each wave disagreed with this statement, implying that paying with the EBT card takes no longer than paying with coupons.

Data on transaction times from checkout observations (discussed in Chapter 5) indicate that EBT transactions do not take significantly more time to complete than coupon transactions, on average. EBT transactions do take longer on average than cash transactions -- nearly 50 seconds longer.¹ Clearly, recipients' reports of system slowdowns and the focus group comments indicate that recipients are very sensitive to the time it takes to complete an EBT transaction.

Overall, there was little change in the nature or frequency of problems reported by recipients during the extended demonstration compared with the original demonstration. Despite the occurrence of some problems with the EBT system, such as slowdowns, equipment failure, system downtime, and damaged cards, the majority of respondents continue to prefer the EBT system over coupons.

6.4 RECIPIENTS' PARTICIPATION COSTS

Estimating the monthly costs of participating in the Food Stamp Program was a major evaluation objective during the original EBT demonstration. The Food and Nutrition Service wanted to know whether the implementation of an EBT system increased or decreased recipients' costs of program participation.

PARTICIPATION COSTS DURING THE ORIGINAL EBT DEMONSTRATION

The evaluation of the original EBT demonstration showed that EBT system users had lower participation costs than recipients using food stamp coupons. Exhibit 6-11 provides the summary of recipients' monthly costs of

¹See Exhibit 5-10.

Exhibit 6-10

Recipients' Assessment of Transaction Time^a

Percentage of Respondents who:	Phase B Wave		Phase C Wave		
	1	2	3	4	5
agree	17.4	25.0	10.5	16.0	12.0
disagree	65.2	62.5	73.7	64.0	36.0
neither agree nor disagree	0.0	4.2	0.0	12.0	52.0
don't know	17.4	8.3	15.8	8.0	0.0

Note: ^a Respondents were asked whether they agree or disagree with the statement: "It's quicker to pay for groceries with coupons than with (EBT) cards."

Exhibit 6-11

**Summary of Monthly Costs of Participating in
the Food Stamp Program: Demonstration vs. Comparison Groups^a**

Demonstration Period:	ATP Comparison Group	EBT Demonstration Group
	Late (N=279)	Late (N=280)
Direct costs of obtaining benefits ^b	\$1.43*	\$0.08*
Opportunity costs of lost or delayed benefits	\$0.74* (3.65)	\$0.10* (0.77)
Direct costs of dealing with problems ^b	\$0.04	\$0.08
Total direct costs per month of program participation	\$2.21* (4.02)	\$0.26 (1.16)
Hours spent obtaining benefits and dealing with problems	0.80* (0.48)	0.20* (0.28)
Value of time, at \$0.28 an hour	\$0.22* (0.13)	\$0.06* (0.08)
Value of time, at \$3.35 an hour	\$2.67* (1.61)	\$0.66* (0.93)
Total costs per month of program participation time valued at \$0.28 per hour)	\$2.44* (4.02)	\$0.32* (1.20)
Total costs per month of program participation (time valued at \$3.35 per hour	\$4.89* (4.35)	\$0.92* (1.80)

Notes: ^aNumbers are the means across the sample. Standard deviations are in parentheses.

^bDirect costs refer to out-of-pocket expenses for babysitting and travel.

*Statistical significance (EBT vs. ATP groups): $P < 0.05$.

Source: William L. Hamilton, et al., The Impact of an Electronic Benefit Transfer System in the Food Stamp Program, Cambridge, Massachusetts: Abt Associates Inc., May 1987, Exhibit 6-14, p. 215.

participation. Average monthly out-of-pocket expenses and opportunity costs of lost or delayed benefits were only \$0.26 for EBT system users, compared to \$2.21 for recipients using ATPs and coupons. In addition, average time spent obtaining benefits and dealing with problems decreased four-fold (from 0.8 hours to 0.2 hours per month) for EBT system users. Most of the decrease in time occurred because EBT users did not need to go to the bank each month to exchange their ATPs for coupons.

When time spent dealing with the program was valued at \$0.28 per hour (based on the average hourly earnings of food stamp recipients in Pennsylvania, including recipients who did not work at all), total average monthly participation costs were \$2.44 for coupon users and \$0.32 for EBT system users. When time is valued at \$3.35 per hour (the federal minimum wage), total average monthly participation costs were \$4.89 for coupon users and \$0.92 for EBT system users. Thus, depending on how one chooses to value time, EBT system users' total participation costs were only 13 to 19 percent of coupon users' costs.

EVIDENCE OF CHANGES IN PARTICIPATION COSTS

As explained earlier in the chapter, the monitoring surveys did not collect information on recipients' costs of participation in the Food Stamp Program. Information from the monitoring surveys and other data sources, however, can be used to assess whether participation costs during Phase C were likely to have been greater or lower than recipients' participation costs during the original demonstration.

Recipient participation costs can be divided into three general categories: the cost of obtaining benefits, the cost of dealing with problems with benefits, and the opportunity cost of lost or delayed benefits. Little evidence was found of an increase in any of these three types of costs in Phase C compared with the original demonstration. Exhibit 6-12 summarizes the available information on factors affecting recipients' participation costs, and these factors are discussed below.

Cost of obtaining benefits. When food stamp recipients who will use the EBT system apply to the program, they have to visit the local welfare office to submit their application, to receive their EBT card, and to receive instructions in how to use the system. Each trip to the office entails time costs and, perhaps, out-of-pocket costs as well.

Exhibit 6-12

Factors Affecting Recipients' Participation Costs

Factors	Original Demonstration Period ^a	Phase B	Phase C
Trips to obtain initial EBT card (average)	1.5	1.7	1.6
Per case month frequency of problems ^b	0.34	0.76	0.37
Average system downtime (minutes/ month)	224	145	202
Percentage of time all lines busy	0.06	0.09	0.01
Percentage of EBT transactions with problems ^c	16%	NA	8.3%
Average increment of time to do typical transaction (additional seconds, compared to coupons) ^c	4.2	NA	2.4

Notes: ^aReference period is the last six months of original demonstration.

^bThis figure does not include transaction reversals for which recipients may need to return to the store or welfare office to complete the transaction. Even if one to two recipients per week went to the welfare office because of transaction reversal problems, the estimated added cost per case month would be very small (less than one cent per case month).

^cTypical EBT transaction times are based on observed EBT transactions, including problem transactions such as reversed transactions. The transaction times, however, do not include time spent to correct a reversal problem at a later date. (See Chapter 5 for details on checkout observations.)

Based on responses to the last recipient interview during the original EBT demonstration, recipients reported making an average of 1.5 trips to the welfare office for application, training and card receipt. During Phase B of the extended demonstration, the 18 new recipients included in the monitoring surveys reported an average of 1.7 trips. The 36 new recipients interviewed during the Phase C monitoring surveys reported an average of 1.6 trips.

An increase in the number of trips required to obtain an initial EBT card will increase recipients' cost of participation. The slight increase in the average number of trips to obtain an initial EBT card in Phase C, however, is estimated to have increased recipients' participation costs by only about one-half cent, assuming no change in the cost of the average trip.¹

An increase in the number of trips required to obtain an initial EBT card also could increase the amount of time recipients spend obtaining benefits. Again, however, the change in time spent obtaining benefits during Phase C is estimated to be very small. Assuming the same average trip length as in the original demonstration, the increase from an average of 1.5 trips to 1.6 trips adds only about half a minute to the estimate of recipients' time to obtain benefits.² Thus, the monitoring survey evidence suggests very little increase occurred in the direct or time costs of obtaining benefits in Phase C, compared with the original EBT system.

Opportunity Cost of Lost or Delayed Benefits. Recipients experienced about the same frequency of problems during Phase C as in the original demonstration, as shown in Exhibit 6-12. The slight increase in frequency of problems reported in Phase C compared to the original

¹The cost per trip in the original demonstration (late survey) was approximately \$0.89. The increase in the number of trips to get an initial card, 0.1, multiplied by \$0.89, yields an estimate of \$0.089 for the cost of the increased trips. Amortizing this cost over recipients' average number of months in the Food Stamp Program (17.5 months, the estimate from the original demonstration), the increased cost per month is estimated to be \$0.005, or half a cent.

²The increase in time spent obtaining benefits is estimated by using the estimated time per trip from the original demonstration, 1.58 hours, multiplied by the increase in trips, 0.1, and divided by the average number of months in the Food Stamp Program, 17.5.

demonstration is estimated to add less than one-tenth of a cent to the opportunity cost of lost or delayed benefits. (This estimate assumes the same opportunity cost per problem as in the original demonstration, but adjusts for the change in frequency of problems.)¹ The opportunity cost of lost and delayed benefits is likely to be small because of the low rate of incidence of problems involving lost or delayed benefits. In addition, most of these problems result in delayed benefits, rather than lost benefits, so that the opportunity cost is usually quite small.

Cost of Dealing with Problems with Benefits. The rate at which problems occur (as reported by recipients) was about the same in Phase C of the extended demonstration as in the original demonstration. This evidence suggests that the cost of dealing with problems with benefits also would not change much in Phase C. Data supplied by the Berks County Assistance Office, however, indicate that the frequency of trips required to replace EBT cards increased during the extended demonstration, so this is one area in which recipients' participation costs have increased.

Whenever an EBT card is lost, stolen, or damaged, the recipient must make a trip to the welfare office to have the card replaced. During the last six months of the original demonstration, BCAO personnel replaced an average of 98.5 EBT cards per month which had been lost, stolen or damaged.² With an average monthly caseload of 3,381 during this period, the average number of trips per recipient for replacement cards was 0.029 each month. During Phase C, the BCAO reported an average of 131 cards replaced per month, or an average of 0.037 trips per recipient per month (based on data from July 1987 to December 1987). Thus, compared to the original demonstration period, recipients during Phase C made an average of 0.008 more trips to the welfare office each month to obtain replacement cards, an increase of 28 percent.

¹The evaluation of the original demonstration assumed an imputed interest rate of 18 percent for the opportunity cost of delayed benefits, and estimated the average length of the delay based on recipients' survey responses.

²Because the number of damaged cards was relatively low during the early months of the original EBT demonstration when all cards had been recently issued, only the last six months of the demonstration period are used for this analysis.

We estimate the cost of these additional trips for replacement EBT cards by assuming that the cost per trip is the same in Phase C as in the original demonstration. The additional trips themselves add only a little less than one cent to the estimated direct cost of participation in the Phase C demonstration.¹ The additional trips for replacement cards also add very little to recipients' time spent per month dealing with problems with benefits. The increase in the number of trips by 0.008 is estimated to add less than one-third minute to recipients' time spent per month.²

In sum, the evidence available indicates that there was little change in the factors affecting the cost of participation for recipients in the Phase C EBT system compared with the original demonstration. This finding suggests that recipients' participation costs did not change much during the extended demonstration. Direct costs of participation are estimated to have increased by a little over one cent, to \$0.27 per month, because of the increase in the number of trips to obtain new or replacement EBT cards. The time recipients spend obtaining EBT cards and dealing with problems related to benefits increased by about one minute, based on available data. Applying the two values of time used in the original demonstration (\$0.28 and \$3.35 per hour), this increase in time is estimated to be valued between one and five cents per case month.

Thus, recipients' total participation costs increased no more than between 2 and 6 cents per month during the extended demonstration, compared with the original demonstration. The evidence from Phase C indicates that recipients' cost of participation in the extended demonstration has remained nearly unchanged from the original demonstration, and is still over 80 percent lower than in the ATP/coupon system.

¹The cost per trip from the original demonstration, multiplied by the increase in the number of trips (0.008) yields an estimated increase in participation costs of \$0.007.

²The increase in time spent is estimated by multiplying the increase in the number of trips by the estimated time per trip from the original demonstration, resulting in an increase of 0.005 hours, or about 0.3 minutes.

proportion of coupons are not redeemed: retailers keep some coupons to make change, and some recipients may store coupons for hard times if their circumstances have recently improved. Nonetheless, over a six-year period, one would expect the amount of coupons kept for these purposes to remain about the same.¹

For the country as a whole, the difference between coupons issued and redeemed for 1982-87 was about \$1.89 per case month.² While this figure may overestimate the amount of benefits lost in unused coupons, it indicates that the cost of unused benefits is an important component of recipients' participation costs in the coupon system as well as the EBT system. The cost of unused benefits in the EBT system was estimated to be \$0.73 per case month, less than half of the estimate for the coupon system.

It is possible that recipients are voluntarily not spending a portion of the unused benefits, i.e., that some households are saving these benefits for future use. If households deliberately choose not to spend some of their benefits, then that portion of the unused benefits should not be viewed as a cost to recipients. Information on when and why households leave unused benefits in their EBT accounts is scanty. However, a study of redemption patterns by households offers some evidence on the behavior of households who left the Food Stamp Program during the original demonstration.³ This analysis found that 60 percent of the sample households that had left the Food Stamp Program (and had not returned by the end of the demonstration) had less than one dollar or one percent of their benefits left in their EBT accounts. Of households with greater amounts of benefits left, nearly two-thirds did not spend any of their benefits after leaving the Food Stamp

¹Some coupons may also be diverted into the underground economy. We assume that the amount diverted over the six-year period is about the same as the amount redeemed, so that the flow of benefits through the underground economy does not affect the estimate of unredeemed benefits.

²Data on redemptions are from RCAP (Redemption Certificate Automated Program) and were provided by the FNS Minneapolis Computer Support Center. The unused coupon estimate does not adjust for the small portion of issued coupons that are destroyed before being redeemed.

³Susan H. Bartlett and Margaret M. Hart, Food Stamp Recipients' Patterns of Benefit Redemption, Cambridge, Massachusetts: Abt Associates Inc., May 1987.

Program. In addition, more than one-third of the households leaving the Food Stamp Program with more than \$1 or 1 percent of benefits remaining spent none of their last month's allotment.

The evidence that some households leave significant benefit amounts in their EBT accounts and that they spend none of these benefits after leaving the Food Stamp Program suggests that these unused benefits do not represent voluntary savings for the most part. The study of redemption patterns hypothesizes that some households may not be aware that they received a last allotment just prior to when they left the program. Other households may not realize that they are entitled to spend the benefits remaining in their EBT accounts. Also, some recipients may be unable to spend their remaining benefits because they have moved suddenly out of the area, died, or been institutionalized. This evidence suggests that while some of the unused benefits may represent a deliberate choice by households, much of the unused benefits may be unspent because of lack of information or an inability to access the account.

These unused benefits, unless left unspent by deliberate choice on the part of the recipient, can be viewed as a cost of participation. If the EBT system makes it more difficult for recipients to use all their benefits than in the coupon system, then this cost would be important to consider. Based on the data available, however, the cost of unused benefits appears to be greater in the coupon system than in the EBT system. Nonetheless, unused benefits may represent a large cost to recipients (relative to other participation costs) and this cost may be important in policy decisions concerning resolution of dormant accounts.

6.5 CONCLUSIONS

From the perspective of food stamp recipients, there was little change in the procedures, equipment or performance of the EBT system during the extended demonstration compared with the original demonstration period. Not surprisingly, therefore, the monitoring surveys found little change in recipients' attitudes about the EBT system or in their participation costs in the EBT system.

During the extended EBT demonstration, recipients continued to overwhelmingly prefer the EBT system to the coupon system. The percentages of respondents preferring each system were quite similar between the monitoring surveys during Phases B and C and the original demonstration. A large majority of respondents (nearly three-quarters or more) preferred the EBT system in each survey, and only a small minority (one-fifth or less) preferred the coupon system.

There was little change in the nature or frequency of problems encountered by recipients. Recipients continue to report experiencing problems with system slowness, equipment not working, and cards lost or damaged. The average frequency of reported problems was nearly the same in Phase C as in the late part of the original demonstration. A smaller percentage of respondents reported experiencing problems with system slowdowns or malfunctions, however, during the extended demonstration. The number of EBT cards replaced (because of loss, theft or damage) did increase somewhat in Phase C compared with the original demonstration.

Recipients' participation costs are estimated to be about the same in Phase C as in the latter part of the original demonstration. The increased number of trips to the welfare office for new and replacement cards is estimated to add only a few cents to recipients' monthly participation costs. Recipients' direct costs of participation are estimated to average \$0.27 per month during the extended demonstration. Also, EBT participants spent about 13 minutes per month on average obtaining benefits and dealing with problems with their benefits. Overall, recipients' total cost of participation remained nearly unchanged from the original demonstration.

The total cost of participation for recipients is still considerably lower in the Phase C EBT system than in the ATP/coupon system. Average monthly direct costs of participation are estimated to be nearly 90 percent lower in the redesigned EBT system than in the ATP/coupon system. The average time spent obtaining benefits and dealing with problems decreased by an estimated 73 percent for EBT system users compared to the ATP/coupon system. Because recipients no longer need to make trips monthly to the bank to pick up coupons, their time and direct costs of participation decreased considerably in the EBT system.

A potential additional cost of participation to recipients is the cost of unused benefits. Benefits that have accumulated in dormant or inactive EBT accounts and are never used can be viewed as part of recipients' costs of participation. This cost is estimated to be quite high, nearly three times the other direct costs of participation in the EBT system. The estimated cost of unused benefits in the coupon system, however, appears to be greater than the cost in the EBT system. While it is difficult to compare unused benefits directly between the two systems (because some "unused" benefits in the coupon system may be coupons not yet redeemed by grocers), the analysis nonetheless indicates that unused benefits may represent a large cost to recipients (relative to other participation costs), and that this cost may be important in FNS' considerations of resolution of the problem of dormant accounts.

Chapter Seven

EFFECTS OF THE EBT SYSTEM ON FINANCIAL INSTITUTIONS

Financial institutions perform a key role in the issuance and redemption of food stamp benefits. Many commercial banks (including some in Reading) act as issuance agents for food stamp benefits, issuing food stamp coupons to program recipients. Commercial banks also receive coupon deposits from grocers. These coupons are then sent to the Federal Reserve, where settlement functions are performed and the coupons are destroyed.

In the EBT system, no banks serve as issuance agents. To effect benefit redemption, the system's clearinghouse bank submits grocers' EBT credits to the Federal Reserve. The Federal Reserve performs settlement functions and transmits the EBT deposits bound for grocer accounts to local banks through the Automated Clearing House (ACH) system. Local banks may receive these deposits through an electronically transmitted ACH file, a magnetic tape, or a paper listing which must be posted manually.

This chapter examines the impact of the redesigned EBT system in Reading on financial institutions' costs of participating in the Food Stamp Program. The activities and participation costs of the three major types of banks involved in benefit issuance and redemption (i.e., local banks in Reading, the system's clearinghouse bank, and the Federal Reserve Bank) are presented, as are bankers' opinions about the EBT and coupon-based issuance and redemption systems.

KEY HYPOTHESES

In the previous evaluation of the Reading EBT system, representatives of financial institutions participating in the EBT demonstration strongly preferred the EBT system to the ATP/coupon system. The reasons for this preference centered around the elimination of their issuance role in the coupon system and the reduction of coupon redemption costs. Cost estimates indicated that the EBT system did have financial advantages for the commercial banks, primarily because it reduced the uncompensated labor costs associated with coupon redemption.

The EBT system also reduced costs incurred by the Federal Reserve Bank (FRB) by eliminating labor-intensive coupon processing and destruction activities. Even though the Federal Reserve's costs for both coupon and EBT processing were fully covered through fees, FRB officials preferred the EBT system, stating that EBT processing more closely resembled their normal operations than did the processing of food stamp coupons.

Based on the findings of the prior evaluation and the similarity of the original and redesigned EBT system designs, it was hypothesized that both commercial banks and the Federal Reserve would prefer the redesigned EBT system to the ATP/coupon system. Cost savings due to the EBT system were expected to be similar to those estimated in the previous evaluation. Due to the redesigned system's faster processing of the daily ACH deposit file, savings might even be greater, because the Federal Reserve's surcharge for night processing of the file would be avoided.

The only major uncertainty in hypothesized effects was the impact of the EBT system on the system's clearinghouse bank. Whereas American Bank & Trust Company in Reading used to be the system's clearinghouse bank, the redesigned system's clearinghouse bank is Commonwealth National Bank in Harrisburg. Possible differences in bank processing activities or cost structures could affect the costs incurred in originating the system's ACH deposits.

RESEARCH STRATEGY

The primary research objective of this portion of the evaluation is to estimate the costs to financial institutions of participating in the Food Stamp Program, most particularly since the Pennsylvania Department of Public Welfare (PDPW) introduced the redesigned EBT system in June 1987. These costs include direct operating costs (such as labor and data transmission) as well as float costs and liability for coupon losses. The evaluation also examines revenues received by the commercial banks and the Federal Reserve Bank for food stamp-related functions.

In addition to measuring costs and revenues, the evaluation examines the opinions and preferences of officials in the participating financial institutions. Central issues include any change in the bankers' preference for the EBT system over the ATP/coupon system, any benefits and drawbacks of the EBT system, and bankers' opinions on expanding the EBT system.

These cost and opinion data were obtained in interviews with personnel at the Federal Reserve Bank of Philadelphia, at Commonwealth National Bank in Harrisburg, and at the four Reading banks that receive most of the credits in the EBT demonstration. The four Reading banks are:

- Meridian Bank (formerly American Bank & Trust Company),
- Hamilton Bank,
- National Bank of Boyertown, and
- Bank of Pennsylvania.

An open-ended interview guide was used to probe the respondents' attitudes toward the redesigned EBT system, particularly in contrast to the paper coupon system, and to request data regarding costs, revenues, procedures, and transaction volumes. In addition to the formal interviews, other bank personnel were contacted, as needed, for specific information.

As food stamp activities constitute only a tiny proportion of the overall operations of the commercial and Federal Reserve banks, few data directly describing these activities are available. Therefore, estimates are based on a combination of interview data and extant data from a consultant's files of bank financial data. These financial data provided information primarily in the area of item processing costs.

With respect to the participation costs of the four banks in Reading, the cost estimates reflect the weighted average cost of all four banks. Bank-specific costs have been weighted by each bank's average monthly volume of benefits issued or redeemed. All cost estimates have also been standardized to costs per \$1,000 in benefits issued or redeemed. This standardization facilitates comparison of coupon-related and EBT system-related costs, and it allows a more direct comparison of banks' participation costs with the estimated costs of other demonstration participants.

HIGHLIGHTS

Local banks' uncompensated costs of food stamp redemption are \$0.67 per \$1,000 of benefits redeemed under the redesigned EBT system, compared with \$7.78 per \$1,000 of benefits under the ATP/coupon system. The EBT system replaces the banks' manual handling of food stamp coupons with the more automated process of accepting and posting electronic funds transfers. Local banks receive compensation for issuing coupons that exceeds their costs, but not enough to offset coupon redemption costs.

Neither the Federal Reserve System nor the EBT system's clearinghouse bank experiences a net cost of participation in the EBT system. Combining all revenues and costs for benefit issuance and redemption, the net cost of the EBT system to financial institutions (as a group) is \$0.11 per \$1,000 of benefits, a 98 percent reduction from the ATP/coupon system figure of \$6.99 per \$1,000 of benefits.

All bank representatives interviewed for the evaluation expressed enthusiastic approval for the EBT system. Local banks strongly supported the elimination of their coupon issuance role, with its associated lobby traffic and paper processing. The EBT system allows these institutions to integrate benefit deposit processing into their normal bank operations.

7.1 LOCAL BANKS' ROLE IN COUPON ISSUANCE

PROCESS OF ISSUING COUPONS

When the Reading EBT demonstration began, all four local banks contacted in the evaluation served as issuance offices for the Food Stamp Program. Currently, only two of the four banks (Meridian and Bank of Pennsylvania) continue to serve as issuance offices, under contract with PDPW. In this role they receive and maintain inventories of food stamp coupons, exchange recipients' ATP cards for coupons, and provide reconciliation reports to PDPW. To perform these functions, the banks incur costs associated with teller time and other resources.

The issuance transaction requires that the bank teller first verify that the person presenting an ATP is authorized to use it by watching the recipient sign the ATP and checking the signature against his or her Food Stamp Program ID card. The teller must also verify that the ATP is valid for the current month. The teller then stamps the ATP, counts the coupon books, has the recipient sign the coupon books, and records the transaction.

Several problems can complicate the ATP transaction and add to the teller's effort. If the recipient lacks a valid ID, the teller must send the recipient to the welfare office for a new ID or contact a caseworker regarding the recipient's eligibility. When the presenter of an ATP is someone other than the recipient to whom it was issued, the teller must verify that the presenter has been authorized by the recipient. When recipients cannot sign

their names, the teller must obtain witnesses to the recipient's mark. In addition, the coupon books can often be difficult to handle, frequently sticking together.

Banks maintain inventories of coupon books to support the ATP transaction function. Supervisory tellers check, record, and store coupon shipments which are received on a four-month delivery cycle. Some banks receive shipments at a central office and distribute them to their branch offices, where they are checked and recorded again. During the peak issuance period, tellers record inventory changes on a daily basis. Full counts of coupon inventories are done monthly.

Banks complete reconciliation forms (the FNS-250) each month and submit them to PDPW with the ATPs they have received, as required by regulations. These forms report monthly inventory figures, ATPs transacted, and tallies of coupons transferred in or out of the issuance office. Completing the reconciliation form may require additional effort if discrepancies are found between the change in the coupon inventory and the total value of ATPs turned in. Banks may also need to respond to inquiries from PDPW staff concerning discrepancies in their inventory reports.

ESTIMATED COSTS OF ISSUING COUPONS

Banks in Reading receive a fee from PDPW of \$1.10 per ATP transacted. Using an average ATP value of \$116.92 (the mean for Pennsylvania, excluding Philadelphia and Allegheny Counties, between October 1987 and September 1988), banks receive \$9.41 in fees per \$1,000 of coupons issued.

The bank personnel interviewed did not have specific data on issuance costs. In previous interviews (when more ATPs were being transacted), bank personnel gave estimates of between one and four minutes of teller time per ATP transaction. This information leads to an estimated average direct labor cost of about 36 cents per ATP (based on an average time of 2.5 minutes at the current average wage and fringe benefit cost of \$8.55 per hour). The time spent on coupon inventory and reporting was estimated at between 0.3 minutes and 1.3 minutes of teller time per ATP per month, for an average cost of 11 cents per ATP (based on a midpoint estimate of 0.8 minutes per ATP). Assuming indirect costs of 100 percent, the labor-related cost

totals about 94 cents per ATP.¹ Therefore, the banks' direct operating cost per \$1,000 of benefits issued is \$8.04.

In addition to the costs of carrying out issuance functions, banks are liable for any food stamp coupons lost and for expired or out-of-state ATPs accepted. Statewide data for Pennsylvania (based on data from October 1987-March 1988) indicate that coupon losses for issuance agents amounted to 0.016 percent of benefits issued, or 16 cents per \$1,000. Expired and out-of-state ATPs amounted to .042 percent of the value of all ATPs transacted between October 1987 and September 1988 (excluding Philadelphia and Allegheny Counties, which do not use the mail ATP system). Thus, banks lost an additional \$0.42 per \$1,000 of benefits transacted.

Adding the billable loss to the operating cost figure, the banks' total issuance costs are estimated at \$8.62 per \$1,000 in coupons issued. This figure is \$1.10 higher than the \$7.51 estimate derived during the original evaluation. Higher average wages explain most of this increase, offsetting a drop in coupon loss rates from 0.05 percent to 0.016 percent between the two evaluation periods.²

Even with the increase in coupon issuance-related costs, banks continue to be reimbursed more for coupon issuance than their estimated costs. With a reimbursement rate of \$9.41 per \$1,000 of benefits issued, banks net an estimated \$0.79 per \$1,000 in benefits issued. The banks in our sample which issue coupons, however, believe that their total costs exceed total compensation. The discrepancy between their perceptions and the estimates of costs and compensation may be due to banks' perceptions of the opportunity cost of teller time. If tellers were not dealing with coupon issuance, they could be performing their primary role of serving depositors.

¹Our consultant's firm, Bank Earnings International, maintains a substantial data base with financial data on bank operations. Examination of operating cost data for banks with sizes in the range of the Reading banks indicates a typical ratio of non-labor to labor costs of approximately one to one. This indirect cost factor is the best available measure of such coupon-related costs as vaulting and counting equipment.

²Banks' losses due to accepting expired and out-of-state ATPs were not included in the previous estimate of coupon issuing costs.

7.2 LOCAL BANKS' ROLE IN COUPON REDEMPTION

This section examines the steps taken and costs incurred by Reading banks to receive and redeem coupons deposited by grocers. The actual procedures followed by any particular bank vary depending on the size of the bank, its number of branch locations, and the volume of coupons it receives.

COUPON REDEMPTION PROCESS

Food coupons are deposited at bank branches by grocers. A grocer assembles all cash, checks, and stamped food coupons intended for deposit, bundles together each type of payment as a separate deposit, and prepares a deposit slip for each bundle. The grocer also fills out a Redemption Certificate for the food stamp coupon deposit. The grocer gives the deposits to the bank teller, who counts the food stamp coupons by denomination and verifies that the total is equal to the total on the deposit slip. If the totals are not equal, the teller recounts the coupons and changes the deposit slip if the grocer's count was wrong. The grocer is given a receipt at the conclusion of the transaction. At this time, the teller also fills out an internal ledger form and attaches it to the food stamp deposit, and completes and attaches the grocer's Redemption Certificate.

Periodically, the food stamp deposits and attached ledger forms are collected from each teller and sent to the appropriate operations area of the bank. Depending on the bank, this area may be a central processing area at a different branch, or the cash control or check processing area within the bank. Here a clerk counts the coupons in each bundle and verifies that the total equals the total shown on the internal ledger form. The clerk then organizes the coupons into batches or "straps" of 100 by denomination and endorses each coupon. Larger banks use a currency counter that automatically counts, endorses, and straps coupons.

After the coupons are strapped, the clerk makes up an internal general ledger slip showing the total amount of coupons represented by all complete and strapped batches as "Due From" the Federal Reserve. The clerk then fills out the Food Coupon Deposit Document and the Federal Reserve Form Cash 31, showing the bank identification number and the total dollar value of the coupons. The forms and batches of coupons are given to a courier for delivery to the Philadelphia Federal Reserve Bank.

The Federal Reserve credits each bank's reserve account for the food coupon deposit on the banking day following the day of receipt. The banks give credit to the depositing grocer at the time of deposit. Thus, if a bank processed food coupons daily, it would absorb one day of "float". This float represents opportunity costs due to the delayed crediting of food stamp coupon deposits.

Prior to the implementation of the EBT system, the four Reading banks sent coupon deposits to the Federal Reserve on an almost daily basis. However, as a result of the EBT system, coupon volumes have decreased dramatically in three of the four local banks, as shown below. Meridian's increase in coupon deposits arises because it now includes more bank branches, owing to merger activity.

Bank	July 1984 Coupon Value	July 1988 Coupon Value	Percent Change
Meridian	\$612,900	\$739,406	+20.6
Hamilton Bank	\$599,100	\$ 11,800	-98.0
Nat'l Bank of Boyertown	\$142,500	\$ 9,000	-93.7
Bank of Pennsylvania	\$106,000	\$ 20,600	-80.6

Three of the four banks indicated that they now send coupons to the Federal Reserve once a week. The fourth bank sends coupons only once per month. This procedural change increases the number of days of float, and hence the float costs to the bank.

ESTIMATED COSTS FOR LOCAL BANKS' COUPON REDEMPTION

Because food stamp coupons represent a very small percentage of both the back office workload and the total deposits of a bank, few banks have made any effort to determine the costs of redemption processing. In 1984, food stamp coupons represented about one percent of the number of checks processed by a typical bank, and one two-hundredth of a percent of the value.¹ Due to EBT's impact on coupon volume in three of the banks, current percentages are even lower.

¹Hamilton et al., op. cit., p. 227.

Although banks do not track their redemption costs, the evaluation data allow estimation of these costs. The four banks reported that between 0.27 and 2.37 person-hours of teller and clerical time are required to process \$1,000 worth of food coupons.¹ The average wage including fringe benefits ranged from \$6.69 to \$9.25 per hour. Direct labor costs at the four banks, therefore, range from \$2.50 to \$19.91 per \$1,000 in coupons. When these labor costs are weighted by coupon volume and a 100 percent indirect rate is applied, the result is a weighted average cost of \$6.43 per \$1,000 in coupons redeemed.

The wide variation in direct labor costs among the banks (\$2.50 to \$19.91) appears to be a function of both coupon volume and staffing policies. Three of the four banks reported a decrease in coupon volume of 80-98 percent between 1984 and 1988, but a decrease in person-hours of only 40-50 percent. This leads to an increase in the number of person-hours required to process \$1,000 in coupons, from an average of 0.38 hours in 1984 to an average of 1.48 hours in 1988. The low figure of \$2.50 was from the large bank in Reading which did not report experiencing a decrease in coupon volume. The high figure of \$19.91 was from a bank which not only experienced a substantial drop in coupons, but which also has its head tellers count and strap coupons, which results in higher costs per person-hour.

In addition to personnel costs, banks also incur costs for transportation. These costs are small because coupons move through the same courier systems that banks use to move checks and cash between branches and a central site, and between the central site and the Federal Reserve. In 1984, these costs were estimated to be \$0.02 per \$1,000 in benefits, based on an average of \$0.21 per run and an average of 35 runs per month. With banks presently transporting coupons an average of 5 or 6 times per month instead of the previous 35 runs per month (including runs between bank branches and central offices), transportation costs per \$1,000 in benefits become negligible.

¹\$1,000 worth of coupons represents about 200 separate food stamp coupons, based on the Philadelphia Federal Reserve Bank's counts of coupons processed in June 1988 and their dollar value. Thus, average teller and clerical time to process a single coupon varies from about 5 seconds to 43 seconds across the four banks.

Float is a somewhat more significant cost to banks, especially since the Reading banks now send coupons to the Federal Reserve only once per week or once per month. Float is the opportunity cost that arises when a bank gives credit to a merchant for a food coupon deposit at the time of the deposit, but does not get credit from the FRB until a later date. The assumption is that these funds could be invested or loaned at a market rate and earn a return rather than lying dormant as uncollected funds.

Based on a 360-day year and a 9.1 percent investment rate, \$1,000 of food coupons produce about 25 cents in lost float for each day they remain uncollected. The four Reading banks have a weighted average float of 5.4 days. Thus, their float cost per \$1,000 in food coupons is estimated at \$1.35. When banks sent their coupons to the Federal Reserve nearly every day, the estimated float cost per \$1,000 of benefits redeemed was \$0.42.¹

Banks can also incur costs during the coupon redemption process if they err when counting coupons or when preparing associated paperwork. Discussions with the Reading banks indicate that three types of errors can occur during redemption:

- discrepancies between the value of a grocer's deposit and the amount credited to the grocer's account;
- discrepancies between the value of coupons sent to the

year. When errors do occur, they are easily resolved by making simple administrative adjustments. Due to the infrequency of these errors, the costs to the bank are negligible per \$1,000 of coupons redeemed.

Combining the estimates of personnel cost (\$6.43), float cost (\$1.35), and transportation costs and costs due to errors (both assumed to be near zero), the weighted average total cost per \$1,000 of food coupons redeemed is currently \$7.78, compared to an estimated total cost of \$5.96 before the implementation of the EBT system.

Exhibit 7-1 summarizes the total costs incurred and compensation received for banks' issuance and redemption of food stamp coupons. For those banks in Reading serving as issuance agents, average compensation received from PDPW exceeds estimated costs by \$0.79 per \$1,000 of coupons issued. With respect to coupon redemption, however, the estimated average costs are \$7.78 per \$1,000 worth of coupons. These coupon redemption costs are not compensated by Federal or State Agencies, nor are they recovered through direct charges to retailers making coupon deposits. Thus, over a time period and geographic area for which total coupons issued equal total coupons redeemed, local banks collectively experience an average net cost of about \$6.99 for every \$1,000 in coupons flowing through the system. The net impact on any particular bank, of course, depends on its relative volume of coupons issued and redeemed and how efficiently it performs these activities. (A bank would have to issue almost ten times as many coupons as it redeemed in order to "break even" on the coupon system.) A bank's net costs arising from coupon issuance and redemption activities are presumably treated as a general operating expense and passed on to other customers (either through increased fees, increased interest rates on loans, or reduced interest rates on deposits).

7.3 BANKS' ROLE IN EBT REDEMPTION

Both the local banks in Reading and the system's clearinghouse bank are involved in the redemption of benefits issued through the EBT system. As described below, however, the system's clearinghouse bank takes the most active role in benefit redemption.

Exhibit 7-1

COUPON ISSUANCE AND REDEMPTION COSTS AND COMPENSATION

<u>Coupon Issuance</u>		
Cost per \$1,000 of benefits issued:		
Labor and overhead		\$8.04
Coupon loss		.16
Expired/out of state ATP losses		.42
Total		\$8.62
Compensation per \$1,000 of benefits issued:		\$9.41
<u>Coupon Redemption</u>		
Cost per \$1,000 of benefits redeemed:		
Labor		\$6.43
Transportation		(a)
Float		1.35
Errors		(a)
Total		\$7.78
Compensation per \$1,000 of benefits redeemed:		None

(a) Estimated cost is negligible and assumed to equal zero.

THE PROCESS OF REDEEMING BENEFITS AT THE CLEARINGHOUSE BANK

Client purchases made using the redesigned EBT system result in electronic credit entries to grocer files. Once each 24-hour period these credits are accumulated in order to effect payment. This occurs during the "bundle-up" process at PDPW's data processing center at Harrisburg State Hospital. All transactions made at a merchant location are combined into one credit entry, to be made to the merchant's bank account through the Federal Reserve's Automated Clearing House network. A computer program writes the credit entries for merchants onto a magnetic tape in the ACH format. PDPW staff send this tape via courier to ACH staff at Commonwealth National Bank. Commonwealth loads the tape onto a computer and, using its ACH software, edits the file and merges the credit entry records with entries from the bank's other ACH applications. The ACH software produces an output file which is transmitted to the Federal Reserve Bank of Philadelphia.

The ACH process described above is a routine part of Commonwealth's banking business day. The EBT file given to Commonwealth is similar to any other ACH input file, such as a payroll file from a local employer. Thus, Commonwealth's role as ACH originator for the EBT system has only a marginal impact on work flow and operating costs.

For the Reading EBT demonstration, USDA does not have funds on deposit at Commonwealth. Therefore, another means of settlement is required to reimburse Commonwealth for the funds drawn from Commonwealth's reserve account when the FRB processes the EBT payment entries. Commonwealth initiates a wire transfer funds request for this dollar total (through the Treasury Financial Communications Systems network) to the Federal Reserve Bank of New York. The New York FRB then communicates a funds transfer from the USDA's Treasury account to Commonwealth's reserve account at the Philadelphia FRB.

ESTIMATED ACH ORIGATION COSTS AT THE CLEARINGHOUSE BANK

According to bank representatives, Commonwealth's cost for originating EBT payments is \$0.052 per item originated, with an "item" defined as a single record indicating that a specified amount of funds should be transferred to a particular retailer's bank account. This cost includes \$0.010 in FRB charges and \$0.042 in personnel costs, communication costs, and

overhead. In July 1988, Commonwealth originated 2,731 EBT payments with a total value of \$535,149.06 in benefits. This results in a cost of \$142.01 for the month, or \$0.27 per \$1,000 in benefits. This figure is \$0.12 per \$1,000 lower than the estimate derived during the original evaluation in which Meridian Bank (formerly American Bank & Trust) served as ACH payment originator. During the original portion of the EBT demonstration, however, American Bank & Trust had to pay night processing surcharges for each ACH entry because the EBT system could not produce the ACH file in time to meet early processing deadlines. Without the redesigned EBT system's improvement in processing speed, Commonwealth would have incurred an additional cost of about \$0.10 per \$1,000 in benefits originated.

Commonwealth also incurs a cost of \$5.00 for every wire transfer it originates. Using a 21.5 day average banking month (based on 258 business days per year), the daily wires to the Federal Reserve Bank of New York amount to a Commonwealth expense of \$107.50 per month, or an additional \$0.20 per \$1,000 in EBT benefits. Therefore, Commonwealth's total cost for originating EBT payments, including both ACH and wire transfer activities, is \$0.47 per \$1,000 of EBT benefits redeemed.

The Pennsylvania Department of Public Welfare, however, pays Commonwealth National Bank a fee for acting as payment originator in the EBT system. This payment is based on a charge of \$5.00 per day and \$0.15 per EBT item. For April through June 1988, the average payment to Commonwealth was \$546.52 per month, or \$1.03 per \$1,000 of benefits redeemed.

THE PROCESS OF RECEIVING AND POSTING ACH CREDITS AT LOCAL BANKS

When the Federal Reserve receives and processes the ACH file transmitted by Commonwealth, it merges these payment entries with entries from all other banks originating ACH files that day. This processing leads to the settlement of funds exchanged between all payer and payee banks, and the creation of an ACH output file for each bank. Each bank participating in the EBT demonstration receives a daily ACH file that includes EBT credits and any other debits or credits initiated by other ACH applications to which the bank is a party.

The output file can be sent to a receiving bank via data transmission or delivered by the FRB check courier on magnetic tape or paper

listings. How and in what form a receiving bank receives its ACH output depends on the processing capabilities of the bank. Banks that receive a transmission or a tape enter the file as input to their ACH software and update customer accounts automatically. Banks that receive paper listings of the ACH payment entries manually post or key enter the account updates.

The ACH file created by the PDPW data processing center today includes payment entries that are effective tomorrow. There is no banking float in this process: the FRB reserve account debit to Commonwealth and the credits to payee banks' accounts are effective on the same day that funds are made available to participating merchants through their bank accounts.

Because the EBT ACH payments are included in the Federal Reserve's ACH output file, along with ACH payments from other sources, there is minimal impact on the receiving bank. An average bank receives several hundred ACH payments each day, only a few of which would have been initiated by the PDPW data processing center. In interviews with Reading bankers concerning the impact of the EBT system, all made the point that the merchant payment process involved no separable action that could be observed or measured. Nevertheless, for estimation purposes, we assume the receiving banks' cost of handling the deposits is equal to Commonwealth's cost of originating them (excluding the ACH charge). This amounts to \$0.042 per item to cover personnel costs, communication costs and overhead, or \$0.21 per \$1,000 of deposits received.

In addition to the costs of handling the ACH deposits, the FRB charges receiving banks a fee of \$0.01 per item and, if needed, \$4.50 per day for courier delivery of physical output (magnetic tapes or paper listings).¹ Two of the four local banks receive the ACH output file electronically, and two receive the output in the form of magnetic tapes.

The two banks in Reading receiving output files through electronic data transmission received 1,822 EBT deposits in July 1988. Their total cost of receiving these deposits, therefore, was \$18.22, or \$0.07 per \$1,000 of deposits. The two banks receiving magnetic tapes through a courier received 754 EBT deposits, for a total cost of \$201.04 (\$7.54 plus 43 courier shipments

¹The definition of "item" in this context is each record in the ACH file which instructs the local bank to credit a particular customer's account.

at \$4.50 per shipment), or \$0.95 per \$1,000 of deposits.¹ The weighted average cost across the four banks of receiving the deposit information is \$0.46 per \$1,000 of benefits received. Adding in the handling cost of \$0.21 per \$1,000 of benefits yields an estimated total cost to local banks of \$0.67 per \$1,000 of EBT benefits received and posted to retailer accounts. This figure is \$0.27 higher than the estimate of \$0.40 per \$1,000 of benefits reported in the original evaluation. The difference arises because the original evaluation estimated handling costs at \$0.40 per \$1,000 of benefits (instead of \$0.27) and did not include the FRB charges to receiving banks.

The EBT-related costs incurred and compensation received by the Reading banks and the system's clearinghouse bank are summarized in Exhibit 7-2. Whereas the clearinghouse banks' total compensation exceeds its total costs, the Reading banks' costs are not compensated by Federal or State Agencies.

7.4 LOCAL BANKS' OPINIONS AND PREFERENCES

In the previous evaluation of the Reading EBT system's impacts on financial institutions, all bank personnel indicated that they preferred the EBT system over the ATP/coupon system. In the current evaluation, the bankers indicated that their preference had not changed. The most important reasons for their preference are that the EBT system accomplishes benefit issuance and redemption without their involvement. Bank personnel emphasized two main benefits of the EBT system: time savings and cost savings.

Benefit issuance and coupon deposit processing require varying amounts of teller and clerk time which might otherwise be used in other bank functions. All four banks in Reading indicated that the reduction or elimination of staff time spent on these activities is a major benefit of the EBT system.

In addition to time savings, local banks also indicated that cost savings were a major benefit of the EBT system. Both coupon issuance and coupon deposit processing increase the operating costs of banks. Although our

¹The total EBT deposits received by the four Reading banks does not equal the 2,731 deposits originated by Commonwealth National Bank because 155 deposits were sent to other banks.

Exhibit 7-2

**EBT OPERATING COSTS AND COMPENSATION FOR THE READING BANKS
AND THE SYSTEM'S CLEARINGHOUSE BANK**

Clearinghouse Bank

Costs per \$1,000 of EBT benefits:

ACH origination	\$0.27
Wire transfers	0.20
Total	\$0.47

Compensation per \$1,000 of EBT benefits:	\$1.03
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Reading Banks

Costs per \$1,000 of EBT benefits:

ACH receipt	\$0.46
Handling	0.21
Total	\$0.67

Compensation per \$1,000 of EBT benefits:	None
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estimates indicate that issuance fees paid to banks exceed banks' issuance costs, the two banks acting as issuance agents perceived that this fee was either equal to or less than the cost of food stamp issuance. Staff at all four local banks indicated that it would be a positive development if the EBT system were to eliminate all coupon issuance in the area, subsequently eliminating coupon redemption costs. Costs associated with coupon deposit processing are uncompensated costs, and banks must absorb the costs of teller and clerical staff time to process the coupon deposits or pass these costs on to other customers.

Bankers mentioned only one major drawback of the new EBT system. When PDPW implemented the redesigned EBT system in June 1987, retailer names were dropped from the deposit records in the ACH files. This appears to have caused some difficulty for banks regarding the posting of EBT deposits. If an EBT transaction is rejected by a bank's computer for any reason (for example, an incorrect account number), banks have difficulty determining which account to post the deposit to. Bank personnel must then expend additional time and effort to locate the correct retailer account and manually post the deposit.

When asked to compare the paper coupon and EBT systems with regard to possible security problems, respondents felt that the coupon system was more vulnerable to losses. They perceived the EBT system as more secure than the paper coupon system because the EBT system does not involve physical coupons which could be lost or stolen.

Bank personnel also were asked to indicate any system improvements they thought would make the EBT system more efficient. Two of the four banks suggested that the EBT system would be more efficient if retailer names once again appeared on the ACH transactions and if the system provided retailers with a deposit receipt showing the amount of each day's EBT deposit. The PDPW is currently preparing to add retailer names to its ACH deposit files. In addition, although the system does not provide retailers with printed deposit receipts, retailers can call a special number each day to ascertain the previous day's deposit total.

Banks had mixed reactions when asked if they thought retailers would participate in an EBT system if they were required to bear part of the cost, such as the equipment cost or a transaction fee. Some bankers said that they thought retailers would continue with EBT because the retailers would not have

to handle food stamp coupons, though it would depend on the size of the fee and the cost effectiveness of the system. Other bankers said, however, that small retailers might not continue if they had to absorb a fee because of their relatively low sales volumes. One banker suggested an approach that would subsidize equipment costs for smaller retailers.

All local banks in Reading felt that financial institutions in other parts of the country would be extremely receptive to EBT systems because operating costs associated with coupon processing would be eliminated. Three of the four banks also indicated that financial institutions would participate in EBT even if they were required to bear some of the costs, as long as EBT costs were lower than coupon costs. One of these banks, however, also suggested that banks could be charged less for receiving EBT transactions to encourage EBT system participation.

Bankers were also asked for their thoughts and opinions on combining the EBT system with the provision of welfare and/or Social Security benefits. All of the banks said they would be receptive to the idea, but that a combined system might be difficult for benefit recipients and small retailers. The banks strongly stressed that many Social Security recipients would not react favorably to an electronic system. They also felt that small retailers might be less likely to have terminals, and might therefore lose business if benefit recipients could purchase food only at stores with terminals.

Lastly, bankers were asked for their opinions on a system in which EBT would be "piggy-backed" onto a commercial POS system. They felt that this would be an improvement over the stand-alone EBT terminals, and that this type of system would be more efficient because increased volume would lead to greater cost effectiveness.

7.5 ROLE OF THE FEDERAL RESERVE SYSTEM

The Federal Reserve Bank of Philadelphia deals with benefit redemption under both the coupon-based and the EBT systems. This section begins with a discussion of the Federal Reserve's coupon redemption activities and costs. It then examines EBT redemption activities and costs. The section ends with a discussion of FRB officials' views and opinions about the coupon and EBT systems.

COUPON REDEMPTION AT THE FEDERAL RESERVE

Couriers take bundled straps of food stamp coupons from banks to the Federal Reserve Bank of Philadelphia's cash-receiving area or check-processing area, where the bundles are separated from the check deliveries and sent to the cash receiving unit by courier receipt clerks. Cash clerks count the straps and bundles to provide a rough verification that the value of coupons sent by a bank is equal to the dollar total shown on the FRB transmittal form sent by the bank with the coupons. If the totals match, a clerk enters data from the transmittal form into a terminal connected to the FRB's internal accounting system. This results in a credit to the bank's reserve account.

Next, the bundles are queued for counting. Straps of one dollar coupons are sampled once per week, but are otherwise assumed to be complete. Straps of higher denominations are piece-counted using food coupon counters that both count and cancel the coupons. This is done on Tuesday, Wednesday, and Thursday of each week. Coupons that have been counted and canceled are stored in a vault to await destruction. The FRB cash destruction team does a two percent piece count on all coupons to ensure that coupons are not missing. Subsequently, they burn the coupons in an incinerator.

Each day, an accounting clerk fills out Treasury Form 5515 to initiate a debit to USDA's Treasury account for the total dollar value of coupon straps received and credited to banks' reserve accounts. Once each week an administrative clerk assembles all of the Redemption Certificates included with each merchant's deposit and forwarded by banks with the coupons, and attaches them to the Food Coupon Deposit Documents. The Deposit Documents and accompanying Redemption Certificates are then sent to FNS's Minneapolis Computer Support Center.

ESTIMATED COSTS OF COUPON REDEMPTION AT THE FEDERAL RESERVE

In an average month, the Federal Reserve Bank of Philadelphia receives about seven and one half million coupons amounting to a face value of \$40,800,000. Twenty-two people are directly involved in the FRB's redemption processing, including receipt clerks, coupon counters, coupon destruction personnel, supervisors, and administrative clerks. These people, in the aggregate, spend an average of 436 hours per week on coupon processing functions. Labor is therefore the major source of expense to the FRB in

coupon redemption. Other sources of expense include materials, equipment, communications, and allocations for the building.

As of June 1988, the FRB of Philadelphia's year-to-date average cost of coupon processing was \$3.29 per thousand coupons. About 90 percent of this figure was for personnel salaries and benefits, 5 percent was for materials and supplies, and the remaining 5 percent was for equipment, communications, and the building allocation. Assuming that 1,000 coupons have an average value of \$5,000 (based on FRB actual piece counts and dollar values for June 1988), the FRB cost per \$1,000 of client benefits was 66 cents.

The U.S. Department of Agriculture compensates the Federal Reserve for the actual cost of coupon processing and funds transfers. The entire Federal Reserve system received \$6.6 million in compensation for the first six months of 1988. The Food Stamp Program issued slightly more than \$5.6 billion in benefits in the first six months of 1988, so the FRB compensation rate amounts to \$1.17 per \$1,000 in benefits redeemed for the first half of 1988.

While our cost estimates for the FRB of Philadelphia seem to suggest that compensation exceeds costs, the compensation estimate is based on a national average. Some FRB branches may have higher costs due to two-stage processing (when the main branch has satellite branches) or higher average labor costs. Because USDA is billed for the actual cost of coupon processing by the FRB, we assume that the Philadelphia FRB's compensation equals \$0.66 per \$1,000 of benefits.

EBT BENEFIT REDEMPTION AT THE FEDERAL RESERVE

In the EBT system, the FRB acts as the clearing and settlement agent for payments to grocers. The FRB receives the ACH file from Commonwealth National Bank and enters it for ACH processing along with similar ACH files received from other banks. This processing entails merging and sorting entries by payee bank, capturing settlement data, and creating an output file for each payee bank.

Settlement is accomplished by accumulating all debits and credits for each bank represented by the payment entries processed, and entering these totals as debits or credits to the bank's reserve account maintained at the FRB. Thus, EBT payments processed through the ACH result in a series of

debits to Commonwealth's account and offsetting credits to the account of each bank that receives payment on behalf of a merchant participating in the EBT demonstration. Settlement is effected on the day after the FRB receives the ACH payment data.

Commonwealth transmits the ACH file containing EBT payments to the Federal Reserve each business night. The FRB does its processing and output functions the same night and in the early hours of the next morning. Output is made available in the early morning in time to meet courier deadlines. This allows almost all receiving banks to have payment data for their customers by the time the bank opens for business. The receiving bank is required to make funds represented by ACH payment entries available to customers as of the day the bank receives payment information.

ESTIMATED COST OF EBT REDEMPTION AT THE FEDERAL RESERVE

The Philadelphia FRB processes ACH payments for over 600 financial institutions in the Third Federal Reserve District. In a typical month, the FRB processes about four million ACH payments with a combined value of \$15-20 billion. The ACH is a mature system that has been operational for over ten years.

The effect of the EBT demonstration on the Federal Reserve's ACH activities is virtually unnoticeable because EBT utilizes the routine processes of the ACH and generates a small volume of payments. Commonwealth National Bank sends less than 3,000 EBT payments per month through the ACH, representing 0.07 percent of the FRB's ACH volume and a smaller proportion of the dollar value.

According to Federal Reserve officials, the cost of Federal Reserve ACH processing is \$34 per thousand items, or 3.4 cents per ACH item. This average cost per item, which includes both direct and indirect costs, can be broken down in the following manner:

Computer and communications	53%
Salaries	20%
Transportation	6%
Supplies and building allocation	5%
Private sector adjustment	16%
	<u>100%</u>

The 3.4 cent per item cost figure includes the costs the Federal Reserve incurs in communicating ACH deposit information to individual banks. For banks receiving output via courier delivery, the average would be greater. Average costs for ACH items transmitted electronically would be lower. Separate estimates for items transmitted through these different methods could not be obtained.

To estimate the Philadelphia Federal Reserve's costs of processing EBT benefits, we rely on the Federal Reserve's policy of setting fees to cover costs (including the private sector adjustment, which represents the imputed opportunity cost of FRB capital). Total costs, therefore, should equal total fees received.

As noted in Section 7.4, the four Reading banks pay the Philadelphia Federal Reserve Bank an average of \$0.46 per \$1,000 of EBT deposits received. Commonwealth National Bank pays the FRB an average of \$0.05 per \$1,000 in benefits transmitted with the ACH file (i.e., \$0.01 per deposit item). Thus, the Philadelphia FRB receives \$0.51 per \$1,000 in EBT benefits processed. This works out to 10 cents per item rather than 3.4 cents per item. The discrepancy in estimated costs per item arises because expensive courier deliveries are required for two of the four Reading banks.

In addition to the Philadelphia FRB's cost of \$0.51 per \$1,000 of EBT benefits processed, the New York Federal Reserve Bank incurs a cost when processing Commonwealth National Bank's daily wire funds request. Assuming that this cost equals the \$5.00 per request charge to Commonwealth, the New York FRB's cost per \$1,000 in benefits is \$0.20.

Summarizing the costs incurred by the Philadelphia and New York Federal Reserve Banks to handle EBT benefit redemption, estimated costs at the Philadelphia FRB equal \$0.51 per \$1,000 of benefits processed through the ACH system. Estimated costs at the New York FRB are \$0.20 per \$1,000 in Treasury funds sent to reimburse Commonwealth National Bank's reserve account. Total costs and compensation, therefore, are \$0.71 per \$1,000 in benefits.

7.6 OPINIONS AND PREFERENCES OF FRB PERSONNEL

Interviews were conducted with officials in the Cash and ACH departments of the Philadelphia Federal Reserve. Respondents indicated that

they did not notice the demonstration's impact in either the coupon processing function or in the ACH function, and would have been unaware of the demonstration's existence if not for the interviews conducted as a result of the prior and present evaluations.

These officials indicated that the EBT system would be a benefit to the Federal Reserve if it eliminated paper coupons and therefore eliminated labor intensive coupon processing and destruction. They were very receptive to the electronic benefit system, although they did express concern over two potential drawbacks to the EBT system. The officials were concerned about smaller retailers participating in the EBT system. These smaller establishments tend to bank at smaller financial institutions and credit unions that do not receive ACH transfers and who do not receive regular courier deliveries. The Federal Reserve must send ACH information to these institutions through the mail, which is both costly and time-consuming. They also indicated that the EBT system would be vulnerable to the same types of technical problems as the ACH system, such as system or tape failures.

7.7 CONCLUSIONS

The results of the present evaluation, like those of the original evaluation, show that financial institutions benefit from an EBT system. Not only does the EBT system provide financial advantages over the ATP/coupon system by reducing uncompensated redemption costs, it also reduces the disruptions associated with coupon issuance and redemption.

Exhibit 7-3 presents a summary of banks' food stamp related costs and compensation for the ATP/coupon system and the redesigned EBT system. In the ATP/coupon system, total costs are estimated at \$17.06 per \$1,000 of benefits issued and redeemed. Total costs are nearly evenly divided between coupon issuance and redemption. Total compensation is estimated at \$10.07 per \$1,000 of benefits, mainly for coupon issuance, yielding a net cost to banks of \$6.99 per \$1,000 of benefits. Local banks and their customers bear these net costs, because redemption costs are not compensated by Federal or State Agencies. The four local banks in Reading do not try to recover these costs through direct charges to retailers making coupon deposits.

Bank costs and compensation are much lower with the EBT system. Total costs are estimated at \$1.85 per \$1,000 of benefits redeemed, while

Exhibit 7-3

COMPARISON OF COUPON COSTS VERSUS EBT COSTS

Per \$1,000 of Benefits

	LOCAL BANKS	CLEARINGHOUSE BANK	FRB(a)	TOTAL
COUPON SYSTEM				
Coupon Cost:				
Issuance	\$8.62	--	--	\$8.62
Redemption	\$7.78	--	\$0.66	\$8.44
TOTAL	\$16.40	--	\$0.66	\$17.06
Coupon Compensation:				
Issuance	\$9.41	--	--	\$9.41
Redemption	(b)	--	\$0.66	\$0.66
TOTAL	\$9.41	--	\$0.66	\$10.07
Net Coupon Cost	\$6.99	--	\$0.00	\$6.99
EBT SYSTEM				
EBT Cost:				
Origination	--	\$0.47	\$0.71	\$1.18
Receipt	\$0.67	--	--	\$0.67
TOTAL	\$0.67	\$0.47	\$0.71	\$1.85
EBT Compensation:				
Origination	--	\$1.03	\$0.71(c)	\$1.74
Receipt	(b)	--	--	--
TOTAL	--	\$1.03	\$0.71	\$1.74
Net EBT Cost	\$0.67	(\$0.56)	\$0.00	\$0.11

(a) For coupon system, applies only to the Philadelphia Federal Reserve Bank; for the EBT system, includes both the Philadelphia and New York Federal Reserve Banks.

(b) Local banks are not compensated for coupon redemption and transfer receipt.

(c) Philadelphia FRB is compensated \$0.46 per \$1,000 of benefits by local banks and \$0.05 per \$1,000 of benefits by the clearinghouse bank. New York FRB is compensated \$0.20 per \$1,000 of benefits by the clearinghouse bank.

total compensation is \$1.74 per \$1,000 of benefits. With these estimated total cost and compensation figures, banks' net costs under the EBT system are \$0.11 per \$1,000 of benefits, a 98 percent reduction from the ATP/coupon system figure.

As shown in the exhibit, most of the benefits of the EBT system accrue to local banks in the demonstration area, primarily because their uncompensated costs to redeem food stamp coupons are eliminated while their costs to accept and post EBT deposit entries are relatively small. As suggested by Federal Reserve personnel, however, very small institutions and credit unions might incur higher costs in receiving and processing ACH information. If such institutions had been included in the sample of Reading banks, estimated EBT costs may have been higher than \$0.67 per \$1,000 of benefits. Because these institutions are likely to handle relatively few retailer accounts, any increase in overall costs probably would be quite small.

All bank representatives interviewed for the evaluation expressed enthusiastic approval for the EBT system. Although the reduction in uncompensated costs certainly influences this response, it is only part of the story. For instance, local banks strongly supported the elimination of coupon issuance activities, even though the analysis indicates that coupon issuance generates more fee income than direct costs. Furthermore, switching to the EBT system has no cost impact on the Federal Reserve because of its cost-based pricing. Even when uncompensated costs are not greatly affected by the EBT system, bank personnel prefer the system because it reduces or eliminates paper processing and lobby traffic. By substituting electronic processing of EBT benefits for the manual handling of food stamp coupons, the EBT system automates the Food Stamp Program-related functions of financial institutions and allows these institutions to integrate benefit processing into their normal bank operations.

In light of the financial and operational advantages provided by the EBT system and the positive views toward EBT held by financial institutions, it is expected that future applications of the EBT concept would be strongly supported by the banking industry.

Appendix IA

GLOSSARY

ACH	Automated Clearing House. Financial network used to process funds transfer requests.
ADMAS	Automated Data Management and Analysis Section, an administrative section within FNS.
ARD	Administrative Review Division, an administrative division within FNS.
ATP	Authorization-to-Participate card. Card used in some jurisdictions to authorize delivery of food stamp coupons to program recipients.
BCAO	Berks County Assistance Office. The local welfare office serving the Reading area.
BIC	Benefit Identification Card. Photo identification card with encoded magnetic stripe used to gain access to benefits in the EBT system.
BIS	Bureau of Information Systems, an administrative bureau within PDPW.
BRD	Benefit Redemption Division, an administrative division within FNS.
BTT	Benefit Transaction Terminal. Equipment located at retail check-out counters to read recipients' BICs and to transmit transaction information to the EBT Computer. Also referred to as Benefit Transfer Terminal.
Case month	An evaluation concept representing one food stamp case's participation in the Food Stamp Program for one month. Because the EBT and ATP/coupon systems served different sized caseloads during the demonstration period, all administrative costs are calculated on a per case month basis to allow comparison of evaluation results.
CB	Compliance Branch, administrative section within FNS.
CIS	Client Information System. The Pennsylvania Department of Public Welfare's computer system which records information on all households participating in programs administered by the department.
CNB	Commonwealth National Bank. Clearinghouse bank which serves as the EBT system's interface to the ACH network.
CPSU	Coupon Production and Supply Unit, an administrative unit within FNS.
DMCS	Division of Management Consulting Services, an administrative division within PDPW.

DPSP Division of Planning and Specialized Programs, an administrative division within PDPW.

EBT Electronic Benefit Transfer. The EBT system uses electronic funds transfer and point-of-sale technologies for the delivery and control of food stamp benefits.

EFT Electronic Funds Transfer.

FNS Food and Nutrition Service. Federal agency within the United States Department of Agriculture responsible for administering the Food Stamp Program.

FSS Food Stamp Section, an administrative section within PDPW.

FRB Federal Reserve Bank.

HSH Harrisburg State Hospital, the location of PDPW's data processing center.

LOC Letter of credit. FNS funding account used to reimburse clearinghouse bank for EBT credits transferred to retailers' bank accounts.

MARO Mid-Atlantic Regional Office. Regional office of FNS serving the Reading area.

MCSC Minneapolis Computer Support Center, an FNS facility.

NACHA National Automated Clearing House Association. All electronic funds transfer requests need to be transmitted in a standard format adopted by this association.

OIG Office of the Inspector General of the United States Department of Agriculture.

OCR Optical character recognition scanner.

PDPW Pennsylvania Department of Public Welfare. State agency responsible for administering Food Stamp Program operations.

PFO Philadelphia Field Office, the local FNS office serving the Reading area.

Phase A The period between January-March, 1986 during which PDPW assumed operational control of the EBT system and relocated the system computers from Reading to Harrisburg, PA.

Phase B The period between April 1986 and June 1987 during which PDPW continued to operate the PRC-designed system while designing and preparing to implement the Phase C EBT system.

Phase C The period from June 1987 to the present during which PDPW operates the redesigned EBT system.

PES Program Evaluation Section, an administrative section within FNS.

PID	Program Information Division, an administrative division within FNS.
PIN	Personal Identification Number. A four-digit code selected by the recipient. This code must be entered on the PIN-pad attached to the BTT before any purchase transaction will be processed in the EBT system. Also required for balance inquiries.
PIN offset	A special number that is based on the recipient's BIC number and PIN. For security reasons, the offset, rather than the PIN itself, is encoded on the card.
POS	Point-of-Sale. Refers to equipment and systems that electronically debit clients' accounts and credit retailers' accounts as a sale is performed.
PRC	Planning Research Corporation. Contractor selected to design, develop, and implement the original Reading EBT system.
RC	Redemption Certificate, completed by grocers when making food stamp coupon deposits.
RDPS	Research and Demonstration Projects Section, an administrative section within FNS.
RPLS	Retailer Participation and Litigation Section, an administrative section within FNS.
RWS	Retailer-Wholesaler Section, an administrative section within FNS.
SMS	State Management Section, an administrative section within FNS.
TSO	Technical Services Division, an administrative division within PDPW's Bureau of Information systems.
TXP	Type of Tandem Corporation processor used in the redesigned EBT system.
USDA	United States Department of Agriculture.
VIPS	Voice Information Processing system, a recorded telephone message which provides retailers with the amount of the most recent deposit to the store's bank account. VIPS can only be accessed through a touch-tone telephone.
WATS	Wide area telephone service used to provide toll-free access for telephone balance inquiries in the redesigned system.

Appendix IB

REPORTS FROM THE EVALUATION OF THE ORIGINAL EBT DEMONSTRATION

John A. Kirlin, Developing an Electronic Benefit Transfer System for the Food Stamp Program, Cambridge, Massachusetts: Abt Associates Inc., August 1985.

John A. Kirlin and William L. Hamilton, Performance Issues in an Electronic Benefit Transfer System for the Food Stamp Program, Cambridge, Massachusetts: Abt Associates Inc., February 1987.

William L. Hamilton, Susan H. Bartlett, Stephen D. Fischer, David C. Hoaglin, Christopher D. Kane, Christopher W. Logan and Thomas R. Marschall, The Impact of an Electronic Benefit Transfer System in the Food Stamp Program, Cambridge, Massachusetts: Abt Associates Inc., May 1987.

Susan H. Bartlett and Margaret M. Hart, Food Stamp Recipients' Patterns of Benefit Redemption, Cambridge, Massachusetts: Abt Associates Inc., May 1987.

OTHER REPORTS FROM THE EVALUATION OF THE EXTENDED EBT DEMONSTRATION

John A. Kirlin, Performance Standards for Electronic Benefit Transfer Systems, Cambridge, Massachusetts: Abt Associates Inc., September 1987.

Christopher W. Logan and Mark G. Menne, Implementing an Integrated Electronic Benefit Transfer System for the Food Stamp Program: Information for State Agencies, Cambridge, Massachusetts: Abt Associates Inc., August 1989.

John A. Kirlin and Charles R. King, Implementation Issues for Integrated EBT/Commercial POS Systems, Cambridge, Massachusetts: Abt Associates Inc., forthcoming.

John A. Kirlin, Charles R. King, Elizabeth E. Davis, Christopher Jones, and Gary P. Silverstein, The Feasibility of a Nationwide Electronic Benefit Transfer System for the Food Stamp Program, Cambridge, Massachusetts: Abt Associates Inc., forthcoming.

APPENDIX IIIA

DATA SOURCES AND METHODS FOR ADMINISTRATIVE COST ANALYSIS

The data on the administrative costs of the ATP/coupon system and the EBT system during the extended demonstration were obtained from interviews, time studies and administrative reports. Phase B operating cost data were obtained in two stages: the time studies, in December, 1986, and the interviews, in August to November, 1987. The Phase B interviews also provided data on the process and costs of the design, development and implementation of the Phase C EBT system. Phase C operating cost data were obtained between March and July, 1988.

ATP/COUPON SYSTEM DATA SOURCES

The principal sources of ATP/coupon system cost data were interviews and time studies. Additional data were obtained from reports provided by FNS and PDPW. Interviews on Phase B and Phase C ATP/coupon system costs were conducted with representatives of the FNS and PDPW units listed below.

FNS Units:

- Accounting Division
- Administrative Review Division
- Automated Data Management and Analysis Section
- Compliance Branch
- Coupon Production and Supply Unit
- Information and Records Management Branch
- Information Resources Management Division
- Mid-Atlantic Regional Office
- Minneapolis Computer Services Center
- Philadelphia Field Office
- Program Evaluation Section¹
- Program Information Division
- Retailer Participation and Litigation Section²
- Retailer-Wholesaler Section³
- State Management Section

¹The Program Evaluation Section is now the State Monitoring and Evaluation Section.

²This section was replaced by the Legislation and Court Suit Section, and its retailer functions were assigned to the Benefit Redemption Division.

³This section is now the Retailer Monitoring Section.

PDPW Units:

- Berks County Assistance Office
- Bureau of Information Systems, Computer Services Division
- Bureau of Information Systems, Eligibility Systems Division
- Bureau of Information Systems, Federal Reporting Section
- Division of Management Consulting Services
- Division of Special Audits
- Mailroom
- Office of the Comptroller
- Office of Income Maintenance, Food Stamp Section

In the interviews, respondents were asked to describe the process by which tasks related to issuance or redemption were accomplished, what staff and other resources were used, and how much time and other costs were incurred. Staff salary and fringe benefit data were obtained from the interview respondents and from official salary schedules. Some PDPW and FNS respondents provided compilations of cost data from accounting records to supplement the interview data. Most FNS interviews were conducted by telephone, while the PDPW interviews were accomplished through a combination of in-person and telephone contacts.

The primary data sources on Berks County Assistance Office (BCAO) labor costs for the ATP/coupon system were the two time studies conducted in December, 1986 (for Phase B) and May, 1988 (for Phase C). In each time study, BCAO caseworkers and clerks completed daily time logs for over 20 working days, recording time spent on issuance-related tasks involving ATP/coupon system cases (such as issuing ID cards or replacing lost ATPs). The logs were designed to replicate the data collected on these tasks during the three waves of time studies conducted for the evaluation of the original demonstration. The timing of the Phase C time study ensured that the data reflected stable operations after the completion of the expansion of the EBT system caseload in April, 1988.

EBT SYSTEM DATA SOURCES

The Phase B and Phase C interviews also provided data on EBT system operating costs. Following the same procedures as the ATP/coupon system interviews, the researchers obtained data from the following units:

FNS Units:

- Accounting Division
- Budget Division
- Mid-Atlantic Regional Office
- Minneapolis Computer Support Center
- Philadelphia Field Office
- Research and Demonstration Projects Section

PDPW Units:

- Berks County Assistance Office
- Bureau of Information Systems, Computer Services Division
- Bureau of Information Systems, Eligibility Systems Division
- Bureau of Information Systems, Federal Reporting Section
- Bureau of Information Systems, Technical Services Division
- Division of Management Consulting Services
- Office of the Comptroller
- Office of Income Maintenance, Bureau of Special Programs

The BCAO time studies provided data on time spent by caseworkers and clerks on EBT system issuance-related tasks in Phases B and C. In addition, EBT system-only time logs were completed during both waves by caseworker supervisors staffing the EBT hotline and by client training staff (including the Human Services Aide assigned to this function and caseworker supervisors who substitute for her as needed).

During the same periods, operations staff at the PDPW computer center at Harrisburg State Hospital (HSH) completed time logs to record EBT system activity. For both HSH time studies, logs were completed by staff in three areas: computer operations, Output Distribution (which operated the HSH branch of the hotline) and the Tape Library. In Phase C, telecommunications operations staff (who were responsible for the Tandem computers, modems and telephone lines used by the EBT system) also completed daily logs during the time study month. A single log was used for each day's activity in each area, with each operator recording his or her time on the log for the area.

Special cost reports for the demonstration were the primary source of non-labor cost data for PDPW EBT system operations. For Phase B, reported non-labor costs were averaged over the entire period (April, 1986 to June, 1987). To ensure consistency with the Phase C time studies and interviews, which reflected the effort to operate the EBT system after the caseload

expansion, the non-labor costs for this period were drawn from cost reports for April, 1988 to June, 1988.¹

Operational costs and design, development and implementation costs for the original EBT demonstration were obtained from that demonstration's evaluation.²

ANALYSIS METHODS

All costs in the analysis are presented in terms of cost per case month. All costs estimated were converted into monthly totals and divided by the appropriate monthly food stamp caseload. This unit is often used in analyses of FSP costs, because it permits comparisons between organizations or systems serving caseloads of different sizes, such as the ATP/coupon system and the EBT system. The average case counts used in the analysis are presented in Exhibit IIIA-1. In general, case counts were averaged over the same period as the cost data to which they were applied (e.g., National-level FNS costs for Fiscal Year 1987 were divided by the national average caseload for the same period). Design, development and implementation costs for the Phase C EBT system were not converted into costs per case month because these costs are largely independent of scale (with the exception of recipient training).

The analysis of the time study data began with tabulations of raw time totals for each category of activity on each log. Missing or incomplete data were imputed by using averages from complete logs. Since each time study ran longer than the average work month, the number of days' data used was restricted to an average work month (21 days for BCAO, which operates only on weekdays, and 30 days for the HSH computer center, which operates on a 24-hour schedule). The Phase C HSH time study data were adjusted to compensate for unusual levels of activity in connection with a shut-down of the entire center on May 21, 1988.

¹Complete cost reports after June, 1988 were not available at the time of the analysis. In addition, changes in salary levels and contracts because of the start of the new State Fiscal Year in July would make subsequent data non-comparable to the April-June data.

²William L. Hamilton et al., op. cit..

Exhibit IIIA-1

Caseload Data Used in Computing Costs per Case Month

Caseload Description	Phase B Average Caseload ¹	Phase C Average Caseload ²
Berks County, Non-Demonstration	1,909	1,020
Berks County, EBT System	3,718	4,241
Berks County Total	5,627	5,261
Pennsylvania - Mail ATP	229,424	210,707
Pennsylvania - Paper ATP ³	399,034	292,694
Pennsylvania - All Non-EBT ⁴	399,034	391,612
Pennsylvania - All	402,752	395,853
Philadelphia Field Office Region	199,048	195,853
Mid-Atlantic Region	911,013	896,392
Nation	7,132,673	7,065,991

Notes: ¹Periods for Phase B caseloads are as follows: Berks County and Pennsylvania, April 1986-June 1987; Philadelphia Field Office Region, Mid-Atlantic Region, and Nation, October 1986-September 1987 (i.e., federal Fiscal Year 1987).

²Periods for Phase C caseloads are as follows: Berks County, April-June 1988; Pennsylvania, February-May 1988 (based on availability of on-line issuance data); Philadelphia Field Office Region, August 1987-January 1988; Mid-Atlantic Region and Nation, October 1987-June 1988.

³Includes mail ATP and direct delivery ATP cases; excludes on-line cases.

⁴Pennsylvania non-EBT caseload includes all paper ATP cases (mail and direct delivery) and, in Phase C, on-line cases in Philadelphia.

Sources: PDPW data files and State Food Stamp Statistics Reports; compilations by FNS Mid-Atlantic Regional Office; FNS Public Information Division National Data Bank.

Labor costs generally were computed by multiplying the estimated time per month spent on a task by the average wage and salary rate for the type of worker involved. Where available, exact rates from the PDPW cost reports or the respondents were used. If more than one type of worker performed a task measured in a time study, the cost was computed for each recorded episode of the task, using the applicable wage and fringe rate for the worker. These episode-level costs were then summed to monthly totals and adjusted as needed. In a few cases, interview respondents provided actual labor totals from accounting records.

Methods used for allocating costs by function differed between the two systems. All ATP/coupon system costs were task-specific, so no allocation among tasks was necessary. In contrast, many EBT system costs (including non-labor costs and some labor costs) were not specific to a single task or even a single function. Major costs that were allocated among multiple tasks included processing charges for the Unisys and Tandem computers, lease and maintenance costs for the hardware used only by the EBT system, and telecommunications charges. Each of these costs was allocated on the basis of usage data, either for the resource itself (e.g., processing time by major task for the Unisys mainframe) or for the staff using it (e.g., hotline staff using the HSH Tandem terminal).

PDPW's cost reports assigned charges to the EBT demonstration for the Unisys and Tandem TXP computers in proportion to the processing time on each of these computers used by EBT operations. As noted in Section 3.1, the monthly EBT system cost for the Tandem TXP of \$1,160 was based on the 2.5 percent utilization of the TXP by the EBT system and the \$46,418 monthly operating cost of the TXP, including amortization and maintenance. PDPW charges Unisys computer costs on the basis of processing time units (SUP hours). The average monthly Unisys computer cost for EBT operations for April through June 1988 was \$1,285, based on an average of 11.307 SUP hours per month at an average cost of \$113.65 per SUP hour. (The cost per SUP hour varies because total SUP hours and total operating costs vary from month to month.) PDPW also assigned an average of \$291 per month in tape processing charges to EBT operations, based on actual tape usage recorded by the BIS accounting system.

The costs assigned to the IBM Series/1 computer system and IBM PC workstation used in Phase B and the POS terminals used throughout the extended demonstration were based on the amounts paid by FNS to buy out the leases on these items at the end of the original demonstration period. The buyout costs were \$50,290 for the Series/1 and peripherals, \$4,583 for the BCAO workstation, and \$98,404 for the POS terminals and printers. For the purposes of the analysis, each group of equipment has been amortized over its remaining useful life as of the time of the buyout at the end of December, 1985. All equipment was assumed to have a useful life of five years from the date of first use, which ranged from December 1983 for one of the Series/1 computers to July 1985 for the disk drive added to the system to increase file capacity. The useful life of 42 months for the computers and peripherals is a weighted average based on the dates of installation for each major component, weighted by the component's lease cost during the original demonstration. Similarly, the amortization period of 45 months for the POS terminals and printers was based on a weighted average of the acquisition dates (which ranged from May 1984 to June 1985), using the number of pieces acquired on each date as the weights.

No usage data were available for the Voice Information Processing System (VIPS) unit and the WATS line linking it to users in Reading, so the costs of these items were allocated equally between recipient and retailer uses. (The survey data could not be used to estimate usage because respondents were asked only whether they used the VIPS, not how often. Recipients outnumber retailers, but retailers presumably use the VIPS much more often.) The recipient share was divided equally between providing issuance information and providing recipient balances (part of benefit delivery).

Applicable indirect costs were added to each direct cost item, including most PDPW and FNS labor costs, as well as some PDPW data processing and equipment costs. The methods used in calculating indirect cost rates are discussed in the next section of this Appendix.

INDIRECT COST FACTORS COMPUTED FOR THE EVALUATION

The operating costs estimated for the ATP/coupon system and the EBT system include indirect costs estimated for all organizations except those

PDPW units that are included in the State's indirect cost rates. The methods differ for BCAO, the PDPW Bureau of Information Systems (BIS), other PDPW units, and FNS units. The following discussion describes the methods used for each of these sets of organizations.

BCAO Indirect Costs. The indirect cost factors estimated for BCAO Phase B and Phase C costs include the costs of unit supervision, general administration, and non-labor support expenses (such as supplies and non-function-specific telephone charges). Using the BCAO staff roster and the PDPW salary schedule for each phase, the monthly costs of supervision for caseworkers and clerks were computed and converted into dollars per full-time direct service staff.¹ The same sources were used to compute labor costs per full-time direct service staff for CAO administration (including the BCAO Executive Director and his immediate staff). Non-labor expenses per full-time direct service staff were computed from PDPW accounting reports for the 1987 and 1988 State fiscal years.

The BCAO indirect cost factors for Phase B and Phase C are presented in Exhibits IIIA-2 and IIIA-3, respectively. The caseworker/human service aide factors were applied to the time spent on ATP/coupon and EBT system tasks by these workers in each phase; the same approach was used for clerical supervision costs. The CAO administration and non-personnel costs were combined into a single factor and applied to all measured direct labor time, including caseworkers, Human Service Aides, clerks, and hotline staff. (The hotline staff do not have separate supervision costs.) For example, the Phase C estimate of caseworker time spent on EBT tasks is 0.14 person-months. Thus, the applicable indirect costs are \$95 for supervision (14 percent of \$684) and \$46 for administration and non-labor overhead (14 percent of \$332), totaling \$141.

Bureau of Information Systems Indirect Costs. Indirect cost factors for the PDPW Bureau of Information Systems (BIS) were provided by PDPW. These factors were based on the overhead costs assigned by PDPW's Cost Allocation Plan to the BIS units involved in Phase C operations. The allocation methodology includes overhead costs from the office of the BIS Director, PDPW

¹Supervision costs for clerks exclude immediate supervisors, whose time was estimated separately.

Exhibit IIIA-2

BCAO Indirect Cost Factors for Phase B

Indirect Cost Category	Total Cost per Month	Number of Applicable Staff	Monthly Cost per Staff
Caseworker/Human Service Aide Supervision and Management	\$45,785	73	\$627
Clerical Supervision	\$2,525	28	\$90
CAO Administration	\$7,715	101	\$76
Non-Personnel Cost	\$27,832	101	\$276

Sources: BCAO staff roster, PDPW salary schedule for 1987 State Fiscal Year; PDPW Cost Report XABCG410 for Berks County Assistance Office, 1987 State Fiscal Year.

Exhibit IIIA-3

BCAO Indirect Cost Factors for Phase C

Indirect Cost Category	Total Cost per Month	Number of Applicable Staff	Monthly Cost per Staff
Caseworker/Human Service Aide Supervision and Management	\$48,589	71	\$684
Clerical Supervision	\$2,626	28	\$94
CAO Administration	\$8,147	99	\$82
Non-Personnel Cost	\$24,794	99	\$250

Sources: BCAO staff roster, PDPW salary schedule for 1988 State Fiscal Year; PDPW Cost Report XABCG410 for Berks County Assistance Office, 1988 State Fiscal Year.

1. Administrative Systems and Applications - Present system used to manage current

2. Financial Systems and Applications - Present system used to manage current

3. Human Resources Systems and Applications - Present system used to manage current

4. Marketing Systems and Applications - Present system used to manage current

5. Operations Systems and Applications - Present system used to manage current

6. Production Systems and Applications - Present system used to manage current

7. Quality Control Systems and Applications - Present system used to manage current

8. Research and Development Systems and Applications - Present system used to manage current

9. Sales Systems and Applications - Present system used to manage current

10. Support Systems and Applications - Present system used to manage current

11. Training Systems and Applications - Present system used to manage current

12. Warehouse Systems and Applications - Present system used to manage current

Other PDPW Indirect Costs. Cost allocation data obtained from PDPW were used to compute State-level overhead costs applicable to BCAO and the Bureau of Special Programs (the unit responsible for programmatic oversight of the EBT system). For the Bureau of Special Programs (BSP), PDPW provided a factor of 2.83 percent, representing costs for PDPW headquarters (above the level of BSP) and agencies outside PDPW that provide services chargeable to the FSP. This rate was used for computing total BSP costs in both Phase B and Phase C. To avoid double-counting, this factor was not applied to organizations that might be included in the headquarters rate, including the Food Stamp Section, the Division of Special Audits, the Division of Management Consulting Services, the Comptroller, and the Mailroom.¹

For State-level overhead applicable to BCAO, PDPW provided data on the total overhead costs allocated to County Assistance Office certification

Exhibit IIIA-4

Indirect Cost Factors for the PDPW Bureau of Information
Systems for Phases B and C

Division	Costs Included	Indirect Cost Rate for State FY 1987-88
Eligibility Systems	Labor	46.2%
Applications Support	Labor	65.3
Computer Services	Labor	18.2
	Unisys processing	18.2
Technical Support	Labor	52.6
Telecommunications	Tandem processing	4.2
	Tandem terminals	4.2
	VIPS	4.2

Source: Special computation by PDPW from Food Stamp Program cost allocation data for State FY 1987-88.

Exhibit IIIA-5

Computation of State-Level Indirect Cost Rate
for BCAO for Phases B and C

1. Total Costs for General Government Operations Assigned to Food Stamp Certification:	\$ 343,544 ¹
2. Total Costs for Statewide County Office Administration Assigned to Food Stamp Certification	\$ <u>269,840</u> ¹
3. Total State-Level Overhead for Food Stamp Certification	\$ 613,384 ¹
4. Less: Bureau of Special Programs Cost for EBT Project	- \$ <u>10,229</u> ²
5. Net State-Level Overhead for Food Stamp Certification	\$ 603,155
6. Total County Assistance Office Costs for Food Stamp Certification	\$5,747,089 ¹
7. State-Level Indirect Cost Factor for BCAO (ratio of 5 to 6)	10.49%

Sources: ¹Food Stamp Program cost allocation worksheets for March 1988.

²PDPW cost reports for EBT project, April-June 1988 (average cost per month).

computing the rate of 10.49 percent. This rate was applied to B CAO labor costs after they were loaded with supervision and local overhead costs, since these local indirect costs were included in the direct certification cost total. Since comparable data were not available for Phase B, the same rate was used for both phases.

FNS INDIRECT COST FACTORS

Two kinds of indirect cost factors were applied to national-level FNS costs for the ATP/coupon and EBT systems. First, the average non-labor cost per full-time equivalent (excluding task-specific costs, such as coupon printing and Federal Reserve Bank payments) was obtained from the FNS Budget Division for the 1987 and 1988 federal fiscal years (which roughly correspond to Phases B and C). This factor was applied to all national-level FNS staff effort related to issuance and redemption, except for those units that reported non-labor costs in the interviews.

Second, an administrative overhead factor was computed for each FNS division included in the study. The overhead factors reflected the cost of supervisory personnel at three levels: the FNS Administrator, the Deputy Administrators, and the division chiefs. Separate factors were computed for each of these levels and combined into the final factors for the divisions.

The FNS indirect cost factors for Phases B and C are shown in Exhibits IIIA-6 and IIIA-7, respectively. The non-labor cost per FTE and most of the division factors increased from Phase B to Phase C, as did the factor for the Deputy Administrator for Family Nutrition Programs. The FNS Administrator factor and the factors for the other Deputy Administrators were based on FY1986 data collected for the original demonstration evaluation. These factors were still valid because the ratios of administrators to staff were the same, and all had received the same percentage increases in pay.

In computing the indirect costs to be added to the direct labor costs for a given unit, the factors were applied cumulatively, beginning with the division factor and ending with the FNS Administrator factor. Thus, the formula for calculating the total labor and overhead cost for a unit is:

Exhibit IIIA-6

FNS Indirect Cost Factors for Phase B

Overhead Level	Overhead Cost	Cost Base ¹	Indirect Cost Factor
FNS Administrator ²	--	--	0.76%
Deputy Administrators:			
Family Nutrition	\$307,091	\$5,891,909	5.21
Financial Management ²	--	--	5.37
Administration ²	--	--	3.82
Family Nutrition Divisions:			
Program Accountability	\$172,287	\$3,419,713	5.04
Program Development	\$159,836	\$1,794,164	8.91
Financial Management Divisions:			
Accounting	\$144,465	\$1,269,535	11.40
Program Information	\$94,023	\$709,977	13.24
Administration Divisions:			
Budget ³	--	--	--
Information Resources Management ²	--	--	10.00
Annual Non-Labor Cost per FTE			\$3,361

Notes: ¹Cost base equals organization total less overhead cost.

²Factor based on FY 1986 data; ratio of overhead to base the same for FY 1987 and FY 1988. See Hamilton *et al.*, *op. cit.*, p. III-17 for computation.

³Division overhead not computed for Budget Division due to very small amount of time spent by staff on EBT activity.

Exhibit IIIA-7

FNS Indirect Cost Factors for Phase C

Overhead Level	Overhead Cost	Cost Base ¹	Indirect Cost Factor
FNS Administrator ²	--	--	0.76%
Deputy Administrators:			
Family Nutrition	\$315,867	\$6,373,133	4.96
Financial Management ²	--	--	5.37
Administration ²	--	--	3.82
Family Nutrition Divisions:			
Benefit Redemption ³	\$114,404	\$2,186,596	5.23
Program Accountability ³	\$114,404	\$1,441,596	7.94
Program Development	\$114,404	\$1,924,596	5.94
Financial Management Divisions:			
Accounting	\$149,512	\$1,220,488	12.25
Program Information	\$97,384	\$736,616	13.22
Administration Divisions:			
Budget ⁴	--	--	--
Information Resources Management ²	--	--	10.00
Annual Non-Labor Cost per FTE			\$3,427

Notes: ¹Cost base equals organization total less overhead cost.

²Factor based on FY 1986 data; ratio of overhead to base is the same for FY 1987 and FY 1988. See Hamilton *et al.*, *op. cit.*, p. III-17 for computation.

³Program Accountability Division and Benefit Redemption Division formed in FY 1988 from former Program Accountability Division.

⁴Division overhead not computed for Budget Division due to very small amount of time spent by staff on EBT activity.

$$\text{Total cost} = (\text{Direct labor cost}) \times (1 + F_a) \times (1 + F_b) \times (1 + F_c)$$

Where: F_a = Administrator cost factor

F_b = Deputy Administrator cost factor

F_c = Division cost factor

This cumulative method was appropriate because the bases to which the higher level overhead costs were allocated included the lower-level indirect costs.

The non-labor indirect cost factor was multiplied by the number of full-time equivalents spent by each unit in each system. This product was added to the cumulative overhead cost to estimate the total indirect cost for each unit for each system.

APPENDIX IIIB

DETAILED ADMINISTRATIVE COST TABLES

This appendix contains detailed tables to supplement the administrative cost analysis in Chapter 3.

Exhibit III-B-1

Phase C ATP System Costs to Authorize Access to Benefits

Agency/Cost Type	Direct Cost Per Case Month	Indirect Cost Per Case Month	Total Cost Per Case Month
Task: Issue/Update/Replace ID			
Berks County Assistance Office:			
labor	0.067	0.029	0.096
supplies (cards)	<u>0.001</u>	--	<u>0.001</u>
BCAO Total:	\$0.068	\$0.029	\$0.097
PDPW Division of Management Consulting Services:			
labor	0.001	--	0.001
shipping	<u><0.001</u>	--	<u><0.001</u>
DMCS Total:	\$0.001	--	\$0.001
Task Total:	\$0.069	\$0.029	\$0.098
Task: Transmit Allotment			
Berks County Assistance Office:			
labor	<u>0.287</u>	<u>0.066</u>	<u>0.352</u>
BCAO Total:	\$0.287	\$0.066	\$0.352
PDPW Division of Management Consulting Services:			
labor	0.001	--	0.001
supplies (blank ATPs)	<u>0.006</u>	--	<u>0.006</u>
DMCS Total:	\$0.008	--	\$0.008

(continued on next page)

Exhibit IIIB-1

ATP System Costs to Authorize Access to Benefits
(continued)

Agency/Cost Type	Direct Cost Per Case Month	Indirect Cost Per Case Month	Total Cost Per Case Month
PDPW Mailroom:			
labor	0.003	--	0.003
contract	0.011	--	0.011
equipment	0.002	--	0.002
postage	0.224	--	0.224
supplies (envelopes)	<u>0.017</u>	<u>--</u>	<u>0.017</u>
Mailroom Total:	\$0.256	--	\$0.256
PDPW Bureau of Information Systems:			
labor	0.012	0.003	0.015
capital	<0.001	--	<0.001
data processing	0.064	0.008	0.071
space	<u>0.002</u>	<u>--</u>	<u>0.002</u>
BIS Total:	\$0.078	\$0.010	\$0.088
Task Total:	\$0.628	\$0.076	\$0.705
Function Total:	\$0.697	\$0.105	\$0.802

Note: Items may not sum exactly to totals because of rounding.

Sources: BCAO time study and PDPW interviews.

Exhibit III-B-2

Phase C EBT System Cost to Authorize Access to Benefits

Agency/Cost Type	Direct Cost Per Case Month	Indirect Cost Per Case Month	Total Cost Per Case Month
Task: Issue/Update/Replace ID			
Berks County Assistance Office:			
labor	0.553	0.219	0.772
capital	0.039	--	0.039
communications	0.231	--	0.231
lease & maintenance	0.054	0.002	0.056
supplies (cards, etc.)	<u>0.073</u>	<u>--</u>	<u>0.073</u>
BCAO Total:	\$0.950	\$0.222	\$1.172
PDPW Division of Management Consulting Services:			
labor	0.002	--	0.002
shipping	<u><0.001</u>	<u>--</u>	<u><0.001</u>
DMCS Total:	\$0.002	--	\$0.002
PDPW Bureau of Information Systems:			
labor	0.002	<0.001	0.002
data processing	<u>0.004</u>	<u><0.001</u>	<u>0.004</u>
BIS Total:	\$0.006	\$<0.001	\$0.006
Task Total:	\$0.958	\$0.222	\$1.180

(continued on next page)

Exhibit III-B-2

Phase C EBT System Cost to Authorize Access to Benefits
(continued)

Agency/Cost Type	Direct Cost Per Case Month	Indirect Cost Per Case Month	Total Cost Per Case Month
Task: Transmit Allotment/ Other Benefit Authorization			
Berks County Assistance Office:			
labor	0.094	0.035	0.129
lease & maintenance	<u>0.009</u>	<u><0.001</u>	<u>0.010</u>
BCAO Total:	\$0.103	\$0.035	\$0.139
PDPW Bureau of Information Systems:			
labor	0.074	0.030	0.106
communications	0.084	--	0.084
data processing	0.073	0.009	0.082
lease & maintenance	<u>0.147</u>	<u>0.006</u>	<u>0.153</u>
BIS Total:	\$0.378	\$0.046	\$0.424
Task Total:	\$0.481	\$0.081	\$0.562
Function Total:	\$1.439	\$0.303	\$1.742

Note: Items may not sum exactly to totals because of rounding.

Sources: BCAO and HSH time studies, PDPW interviews, and cost reports.

Exhibit IIIB-3

Phase C ATP System Costs to Deliver Benefits

Agency/Cost Type	Direct Cost Per Case Month	Indirect Cost Per Case Month	Total Cost Per Case Month
Task: Manage Coupon Supply			
PDPW Food Stamp Section:			
labor	0.007	--	0.007
contract	0.067	--	0.067
lease	<u><0.001</u>	<u>--</u>	<u><0.001</u>
FSS Total:	\$0.074	--	\$0.074
FNS Mid-Atlantic Regional Office:			
labor	<u>\$0.001</u>	<u>\$<0.001</u>	<u>\$0.001</u>
MARO Total:	\$0.001	\$<0.001	\$0.001
FNS Coupon Production and Supply Unit:			
labor	0.003	<0.001	0.003
contract	<u>0.196</u>	<u>--</u>	<u>0.196</u>
CPSU Total:	\$0.199	\$<0.001	\$0.199
PDPW Division of Special Audits:			
labor	0.011	--	0.011
travel	<u>0.001</u>	<u>--</u>	<u>0.001</u>
DSA Total:	\$0.012	--	\$0.012
Task Total: ¹	\$0.285	\$<0.001	\$0.286

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Exhibit IIIB-3

Phase C ATP System Costs to Deliver Benefits
(continued)

Agency/Cost Type	Direct Cost Per Case Month	Indirect Cost Per Case Month	Total Cost Per Case Month
Task: Transact ATPs			
PDPW Food Stamp Section:			
labor	0.004	--	0.004
bank fees ²	1.133	--	1.133
postage	<0.001	--	<0.001
supplies	<0.001	--	<0.001
FSS Total:	\$1.138	--	\$1.138
PDPW Comptroller:			
labor	0.001	--	0.001
Comptroller Total:	\$0.001	--	\$0.001
Task Total:¹	\$1.139	--	\$1.139
Function Total:¹	\$1.424	\$<0.001	\$1.425

Notes: ¹ Items may not sum exactly to totals because of rounding.

² Bank fees were estimated at \$1.10 per ATP times 1.03 ATPs per case month. Billings to issuance agents for coupon losses and expired ATPs transacted were combined with gross fee per ATP to estimate net fee per ATP transacted. The ratio of net fee per case month (based on average fees paid during Phase C, excluding offsetting loss billings) to net fee per ATP was used to estimate the 1.03 ATPs per case month. This method was also used to estimate the number of ATPs per case month for Phase B.

Sources: BCAC time study, PDPW and FNS interviews.

Exhibit III-B-4

Phase C EBT System Costs to Deliver Benefits

Agency/Cost Type	Direct Cost Per Case Month	Indirect Cost Per Case Month	Total Cost Per Case Month
Task: Process Transactions			
PDPW Bureau of Information Systems:			
labor (Technical Services Div.)	0.006	0.003	0.010
data processing	<u>0.222</u>	<u>0.009</u>	<u>0.231</u>
BIS Total:	\$0.229	\$0.013	\$0.241
Task Total:	\$0.229	\$0.013	\$0.241
Task: Resolve Transaction Problems			
Berks County Assistance Office:			
labor	0.066	0.014	0.080
lease & maintenance	<u>0.026</u>	<u>0.001</u>	<u>0.028</u>
BCAO Total:	\$0.093	\$0.015	\$0.108
PDPW Bureau of Information Systems:			
labor	0.034	0.006	0.041
communications	0.259	--	0.259
data processing	0.001	<0.001	0.002
lease & maintenance	<u>0.112</u>	<u>0.005</u>	<u>0.117</u>
BIS Total:	\$0.408	\$0.011	\$0.419
Task Total:	\$0.500	\$0.026	\$0.527

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Exhibit IIIB-4

Phase C EBT System Costs to Deliver Benefits
(continued)

Agency/Cost Type	Direct Cost Per Case Month	Indirect Cost Per Case Month	Total Cost Per Case Month
Task: Maintain Terminal Network			
BCAO:			
labor	0.045	0.010	0.055
supplies	<u>0.036</u>	--	<u>0.036</u>
BCAO Total:	\$0.081	\$0.010	\$0.091
Bell of PA:			
communications	<u>0.637</u>	--	<u>0.637</u>
Bell of PA Total:	\$0.637	--	\$0.637
PDPW Bureau of Information Systems:			
labor	0.022	0.010	0.032
communications	<u>0.020</u>	--	<u>0.020</u>
BIS Total:	\$0.042	\$0.010	\$0.052
FNS (equipment buyout):			
capital	<u>0.567</u>	--	<u>0.567</u>
FNS Total:	\$0.567		\$0.567
Unisys (Terminal installation and maintenance):			
contract	<u>1.526</u>	--	<u>1.526</u>
Unisys Total:	\$1.526	--	\$1.526
Task Total:	\$2.853	\$0.020	\$2.872

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Exhibit IIIB-4

Phase C EBT System Costs to Deliver Benefits
(continued)

Agency/Cost Type	Direct Cost Per Case Month	Indirect Cost Per Case Month	Total Cost Per Case Month
Task: Provide Recipient Balances			
PDPW Bureau of Information Systems:			
communications	0.039	--	0.039
lease & maintenance	<u>0.147</u>	<u>0.006</u>	<u>0.153</u>
BIS Total:	\$0.186	\$0.006	\$0.192
Task Total:	\$0.186	\$0.006	\$0.192
Function Total:	\$3.767	\$0.065	\$3.832

Note: Items may not sum exactly to totals because of rounding.

Sources: BCAO and HSH time studies, PDPW interviews, and cost reports.

Exhibit IIIB-5

Phase C ATP System Costs to Credit Retailers

Agency/Cost Type	Direct Cost Per Case Month	Indirect Cost Per Case Month	Total Cost Per Case Month
Task: Process Coupon Deposits/ Oversee FRB Processing:			
Federal Reserve Bank:			
contract	<u>0.161</u>	--	<u>0.161</u>
FRB Total:	\$0.161	--	\$0.161
FNS Accounting Division:			
labor	<u><0.001</u>	<u><0.001</u>	<u><0.001</u>
AD Total:	\$<0.001	\$<0.001	\$<0.001
Task Total:	\$0.161	\$<0.001	\$0.161
Function Total:	\$0.161	\$<0.001	\$0.161

Note: Items may not sum exactly to totals because of rounding.

Sources: FNS interviews.

Exhibit III-B-8

Phase C EBT System Costs to Manage Retailer Participation
(continued)

Agency/Cost Type	Direct Cost Per Case Month	Indirect Cost Per Case Month	Total Cost Per Case Month
Task: Oversee Redemption System			
FNS Retailer Participation and Litigation Section: ²			
labor	<u>0.001</u>	<u><0.001</u>	<u>0.002</u>
RPLS Total:	\$0.001	\$<0.001	\$0.002
FNS Retailer-Wholesaler Section: ²			
labor	0.003	0.001	0.004
publications	<0.001	--	<0.001
travel	<u><0.001</u>	<u>--</u>	<u><0.001</u>
RWS Total:	\$0.004	\$0.001	\$0.004
Task Total: ¹	\$0.005	\$0.001	\$0.006
Function Total: ¹	\$0.307	\$0.024	\$0.332

Notes: ¹ Items may not sum exactly to totals because of rounding.

² These FNS national-level units performed these tasks at the time of the Phase C interviews. See Section 3.1 for discussion of subsequent reorganization.

Sources: BCAO and HSH time studies, PDPW and FNS interviews, and PDPW cost reports.

Exhibit IIIB-9

Phase C ATP System Costs to Reconcile and Monitor Issuance System

Agency/Cost Type	Direct Cost Per Case Month	Indirect Cost Per Case Month	Total Cost Per Case Month
Task: Reconcile Issuances			
PDPW Food Stamp Section:			
labor	<u>0.018</u>	--	<u>0.018</u>
FSS Total:	\$0.018	--	\$0.018
PDPW Division of Management Consulting Services:			
labor	0.001	--	0.001
contract	<u>0.050</u>	--	<u>0.050</u>
DMCS Total:	\$0.051	--	\$0.051
PDPW Mailroom:			
labor	<u>0.002</u>	--	<u>0.002</u>
Mailroom Total:	\$0.002	--	\$0.002
PDPW Bureau of Information Systems:			
labor	0.051	0.012	0.063
contract	0.003	--	0.003
data processing	0.062	0.009	0.071
printing	<0.001	--	<0.001
space	<u>0.002</u>	--	<u>0.002</u>
BIS Total:	\$0.119	\$0.021	\$0.139
Task Total:	\$0.189	\$0.021	\$0.210

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Exhibit III-B-9

Phase C ATP System Costs to Reconcile and Monitor Issuance System
(continued)

Agency/Cost Type	Direct Cost Per Case Month	Indirect Cost Per Case Month	Total Cost Per Case Month
Task: Report Issuance Losses			
PDPW Food Stamp Section:			
labor	<u>0.001</u>	--	<u>0.001</u>
FSS Total:	\$0.001	\$<0.001	\$0.001
FNS Information Resources Management Division:			
labor	<0.001	<0.001	<0.001
data processing	<u>0.001</u>	--	<u>0.001</u>
IRMD Total:	\$0.002	\$<0.001	\$0.002
FNS Mid-Atlantic Regional Office:			
labor	<0.001	<0.001	<0.001
contract	<u>0.005</u>	--	<u>0.005</u>
MARO Total:	\$0.005	\$<0.001	\$0.005
Task Total:	\$0.008	\$<0.001	\$0.009

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Exhibit IIIB-9

Phase C ATP System Costs to Reconcile and Monitor Issuance System
(continued)

Agency/Cost Type	Direct Cost Per Case Month	Indirect Cost Per Case Month	Total Cost Per Case Month
Task: Oversee Issuance Systems			
FNS Automated Data Management and Analysis Section:			
labor	<u><0.001</u>	<u><0.001</u>	<u><0.001</u>
ADMA Total:	\$<0.001	\$<0.001	\$<0.001
FNS Mid-Atlantic Regional Office:			
labor	0.005	0.001	0.005
travel	<u><0.001</u>	--	<u><0.001</u>
MARO Total:	\$0.005	\$0.001	\$0.006
FNS Program Evaluation Section:			
labor	<u><0.001</u>	<u><0.001</u>	<u><0.001</u>
PES Total:	\$<0.001	\$<0.001	\$<0.001
FNS Program Information Div.:			
labor	<u><0.001</u>	<u><0.001</u>	<u><0.001</u>
PID Total:	\$<0.001	\$<0.001	\$<0.001
FNS State Management Section:			
labor	<u>0.001</u>	<u><0.001</u>	<u>0.001</u>
SMS Total:	\$0.001	\$<0.001	\$0.001
Task Total:	\$0.006	\$0.001	\$0.007
Function Total:	\$0.203	\$0.023	\$0.226

Note: Items may not sum exactly to totals because of rounding.

Sources: FNS and PDPW interviews.

Exhibit III-B-10

Phase C EBT System Costs to Reconcile and Monitor Issuance Systems

Agency/Cost Type	Direct Cost Per Case Month	Indirect Cost Per Case Month	Total Cost Per Case Month
Task: Reconcile Issuances			
PDPW Bureau of Information Systems:			
labor	0.007	0.001	0.009
data processing	0.050	0.009	0.059
printing	<u><0.001</u>	<u>--</u>	<u><0.001</u>
BIS Total:	\$0.057	\$0.010	\$0.068
Task Total:	\$0.057	\$0.010	\$0.068
Task: System Reconciliation			
FNS Accounting Division:			
labor	<u>0.007</u>	<u>0.002</u>	<u>0.008</u>
AD Total:	\$0.007	\$0.002	\$0.008
FNS Budget Division:			
labor	<u><0.001</u>	<u><0.001</u>	<u>0.001</u>
BD Total:	\$<0.001	\$<0.001	\$0.001
PDPW Bureau of Information Systems:			
labor	0.036	0.008	0.044
data processing	<u>0.119</u>	<u>0.022</u>	<u>0.141</u>
BIS Total:	\$0.155	\$0.030	\$0.185

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Exhibit IIIB-10

Phase C EBT System Costs to Reconcile and Monitor Issuance Systems
(continued)

Agency/Cost Type	Direct Cost Per Case Month	Indirect Cost Per Case Month	Total Cost Per Case Month
FNS Research and Demo. Project Sec.:			
labor	<u>0.047</u>	<u>0.009</u>	<u>0.056</u>
RDPS Total:	\$0.047	\$0.009	\$0.056
Task Total:	\$0.209	\$0.041	\$0.250
Task: Report System Activity			
PDPW Bureau of Information Systems:			
labor	<0.001	<0.001	<0.001
data processing	<u>0.006</u>	<u>0.001</u>	<u>0.007</u>
BIS Total:	\$0.006	\$0.001	\$0.007
Task Total:	\$0.006	\$0.001	\$0.007
Task: Oversee System Operations			
PDPW Division of Planning and Specialized Programs:			
labor	<u>0.388</u>	<u>0.011</u>	<u>0.399</u>
DPSP Total:	\$0.388	\$0.011	\$0.399
PDPW Bureau of Information Systems:			
labor	0.793	0.465	1.258
lease & maintenance	<u>0.123</u>	<0.001	<u>0.123</u>
BIS Total:	\$0.916	\$0.465	\$1.382
Task Total:	\$1.304	\$0.476	\$1.780
Function Total:	\$1.577	\$0.528	\$2.105

Note: Items may not sum exactly to totals because of rounding.

Sources: HSH time study, PDPW and FNS interviews, and PDPW cost reports.

Appendix VA

DATA SOURCES FOR ANALYSIS OF EBT EFFECTS ON RETAILERS

Data used for the retailer analyses presented in Chapter 5 were collected from two primary sources: interviews with retailers participating in the demonstration and observations of purchase transactions at checkout counters. This appendix describes these data sources and outlines the methods used to collect the data. Other sources also provided data to the analysis. These sources are described at the end of this appendix.

Retailer Interviews

Main Interviews. Retailers were asked for their opinions and perceptions on a wide array of system-related topics during in-person interviews conducted between April and June, 1988. These interviews also provided cost information for all retailer participation cost components except checkout counter productivity. We completed interviews with 114 of the 129 retailers participating in the demonstration. Exhibit VA-1 shows the distribution of demonstration and sample stores among the major strata used in the analysis (i.e., supermarkets, grocery stores, convenience stores and other stores) and the categories of store type which FNS uses to monitor retailer participation.

Given the high percentage of completed interviews (88 percent), it is not surprising that the distribution of stores in the interview sample closely resembles that of the population of EBT participating retailers. On the basis of store type distribution, however, the interview sample differs slightly from national data. The interview sample contains greater percentages of supermarkets and grocery stores (particularly specialty food stores) than exist nationally. Moreover, relative to the national distribution, the interview sample includes smaller percentages of convenience stores and combination grocery and gas stores.

Periodic Interviews. In addition to the main retailer interviews conducted between April and June of 1988, we periodically interviewed a small sample of 30 retailers as part of an effort to monitor ongoing EBT system operations. These interviews were conducted in six waves, spaced roughly five months apart, between October 1986 and January 1989.

Exhibit VA-1

Store Distribution by FNS Code

	Number of Stores in Demon- stration	% of Stores in Demon- stration	Number of Stores in Sample	% of Stores in Interview Sample	% of Stores Nation- wide
<u>Supermarkets</u>					
Supermarket (SM)	25	19.4%	23	20.2%	15.2%
<u>Grocery Stores</u>					
Small/Medium Grocery (GS)	37	28.7%	35	30.7%	27.9%
Specialty Food (SF)	26	20.2%	20	17.5%	8.8%
Subtotal	63	48.8%	55	48.2%	36.7%
<u>Convenience Stores</u>					
Convenience Store (CS)	15	11.6%	14	12.3%	22.8%
Combination Grocery/Gas (CG)	7	5.4%	7	6.1%	10.5%
Subtotal	22	17.1%	21	18.4%	33.3%
<u>Other Stores</u>					
Produce Stand (PS)	4	3.1%	4	3.5%	2.8%
Other Firm (OF)	1	0.8%	1	0.9%	2.7%
Health/Natural Food Store (HF)	1	0.8%	0	0.0%	1.1%
Comb. Grocery/Merchandise (CM)	0	0.0%	0	0.0%	2.7%
Milk Route (MR)	1	0.8%	0	0.0%	0.6%
Other Combination (CO)	11	8.5%	10	8.8%	1.6%
Other	1	0.8%	0	0.0%	3.8%
Subtotal	19	14.7%	15	13.2%	15.3%
Total	129	100%	114	100.0%	100.0%

Sources: EBT Merchant Report generated March 1988 and FNS Redemption Report. National data come from Program Accountability Division, FNS, Food Stamp Program: State Table of Activity Ranking, Plus. Alexandria, VA: Food and Nutrition Service, April, 1988.

Because the primary purpose of the periodic interviews was to monitor EBT system operations, the initial sample comprised those stores which conducted the highest food stamp redemption volumes among supermarkets, grocery stores and convenience stores. Roughly the same 30 retailers were interviewed in all six waves, although attrition required the replacement of three grocery stores and a convenience store. The initial interview wave was conducted in-person; subsequent interview waves were conducted primarily by telephone, with a few interviews being conducted in Spanish in-person. A summary of the periodic retailer interview responses is presented in Appendix VC.

Exit Interviews. Retailers who dropped out of the demonstration were interviewed to learn if their decision to drop out was related to EBT system participation. Between October 1986 and December 1988, 25 food retailers left the demonstration either because they went out of business or sold their business.¹ Interviews were conducted with 15 of these retailers. None of the retailers indicated that the EBT demonstration had any influence on their decision to go out of business or to sell their business.

Checkout Counter Observations

The analysis of EBT effects on checkout counter productivity is based on data collected during 80 days of checkout counter observations at 30 participating stores in Reading and 10 non-demonstration stores in Allentown, Pennsylvania. The non-demonstration stores in Allentown were included in the analysis to provide a sample of transactions using food stamp coupons. Fourteen supermarkets, 13 grocery stores, and 13 convenience stores comprise the sample. To maximize the number of food stamp transactions observed, stores in both locations were chosen on the basis of having high food stamp redemption levels among supermarkets, grocery stores, and convenience stores.

Observations were conducted during the same time period (April-June, 1988) as were store interviews, and many of the same personnel assisted on

¹Additionally, during the Fall of 1986 BCAO removed the EBT store equipment from three stores who had not processed any EBT transactions in three months. These stores still remained authorized to participate in the Food Stamp Program but could not process electronic EBT sales. Since that time, BCAO has not removed any store's EBT equipment because of inactivity.

both data collection efforts. To maximize the number of observed food stamp transactions, observations were scheduled on each month's issuance days and the two subsequent business days. Each day's observation sessions included 12 thirty-minute segments, during which the observer recorded the following information about each sale:

- number of customers in line at start of order
- number of items in order
- dollar value of purchase
- start/end of ringing time
- unusual circumstances during ringing (produce weighing, price checks, etc.)
- payment method (cash, check, manufacturer's coupons, food stamp coupon, EBT card, etc.)
- start/end of payment time
- unusual circumstances during payment (bottle return, items returned, etc.)
- start/end of bagging time, and
- type of bagger (cashier, customer, bagger).

Exhibit VA-2 shows the number and payment method for transactions observed, by major store type.

Other Data Sources

To standardize all retailer costs to cost per \$1,000 of benefits redeemed, the analysis required store-level information on monthly EBT and food stamp coupon redemptions. Information on total monthly food stamp redemptions (EBT and coupon combined) came from FNS' Minneapolis Computer

Exhibit VA-2

Number of Observed Checkout Counter Transactions, by Store Type

Payment Form	Super- markets	Grocery Stores	Convenience Stores	Total
EBT	156	183	105	444
Food Stamp Coupons	89	143	58	290
Cash	2,255	2,377	3,197	7,829

Source: Phase C Observation Data.

- average monthly food sales;
- average monthly food stamp redemptions as a percentage of total food sales over the previous three quarters;
- monthly food stamp redemptions and percentage of total food sales for each of the three preceding months; and
- a three-month average redemption and percentage of total food sales.

Monthly food stamp redemption levels used in the retailer analyses are based on the average monthly store redemption during the six months prior to retailer data collection (i.e., October 1987 through March 1988).

Retailer EBT redemption levels are based on data reported in the system's monthly report of retailer activity. EBT redemption totals in the retailer analysis are based on monthly levels during the same six-month period (October 1987 through March 1988) that provided information on overall food stamp average sales.

The average monthly value of food stamp coupon sales was computed as the difference between average monthly total food stamp sales and average monthly EBT sales. Because these data come from different sources and are six-month averages, the average monthly EBT total slightly exceeded the average total food stamp volume at a couple of stores. For these stores, a zero monthly food stamp coupon level was assumed.

Appendix VB

ANALYSIS PROCEDURES

The analysis of retailer participation costs presented in Chapter 5 includes three components: the analysis of retailer opinions and perceptions; the analysis of checkout counter productivity; and the analysis of other retailer participation costs. Appendix VA outlines the data sources on which these analyses are based. This appendix provides additional information about the analysis procedures used to generate the evaluation results presented in Chapter 5.

The evaluation's measurement of retailer opinions and perceptions is generally straightforward. Opinion and perception data presented in Chapter 5 are simple tabulations of the retailers' interview responses. The cost analyses are somewhat more complicated, particularly the analysis of checkout productivity. This appendix, therefore, focuses on estimated retailer participation costs and the techniques used to develop these estimates.

Retailer Participation Cost

Food retailers' cost to participate in the Food Stamp Program is defined as the value of any time store personnel spend on program-related activities, plus the value of any resources which are used in performing these activities. Exhibit VB-1 identifies the components of retailer participation cost.

Specific methodologies for estimating each cost component are identified in Chapter 5. In most cases, participation cost is simply the product of employee time spent performing an activity and the wages paid to that employee. Other cost components (e.g., accounting errors, float, and telephone costs) depend on the frequency of an event and the value of that event. Space cost depends only on the amount of space retailers perceive as being occupied by store equipment and the average rental value of the space.

Exhibit VB-1

Comparative System Cost Elements

<u>Coupon System Costs</u>	<u>EBT System Costs</u>
checkout costs	checkout costs
handling costs (including reconciliation)	handling costs (including reconciliation)
training costs	training costs
accounting error costs	accounting error costs
float costs	float costs
reshelving costs	reshelving costs
	telephone costs
	space costs
where	
checkout costs =	the amount of cashier time required to process each sale, multiplied by cashier wage
handling cost =	the amount of time required to count, bundle, cancel and deposit food stamp coupons and reconcile the account, or the amount of time required to reconcile the EBT account, multiplied by the relevant wage
training costs =	the amount of time required to instruct new hires in Food Stamp Program regulations and the proper procedures for handling food stamp coupons or EBT cards, multiplied by the relevant wages
accounting error costs =	the dollar value of permanent losses, if any
float costs =	the number of days between the time a food stamp sale is transacted and the time that amount is credited to the store's account, multiplied by the daily interest rate on demand deposits
reshelving costs =	the amount of time required to reshelve merchandise which has been returned by customers, or which has been left at the checkout counter because of customer's inability to pay, multiplied by the relevant wage
telephone costs =	the dollar value of unreimbursed message unit charges incurred by those grocers with shared BTT/telephone connections
space costs =	the amount of space occupied by EBT equipment, multiplied by the cost of space per square foot per month

Standardizing EBT and Coupon Costs

For each store type, Chapter 5 presents costs in terms of both average monthly cost and cost per \$1,000 of redemptions. Average monthly cost is useful as a measure of the overall amount of resources retailers spend to participate in the Food Stamp Program. This measure can be somewhat misleading, however, because it mixes stores with small and large redemption volumes. Moreover, because total EBT redemptions in the demonstration stores were considerably larger than total coupon redemptions (as shown in Exhibit VB-2), average monthly costs cannot be used to measure demonstration impacts. The problem is eliminated by standardizing EBT and coupon costs in terms of \$1,000 of food stamp redemptions.

Cost per \$1,000 of benefits redeemed for all stores is defined as the sum (across store types) of average monthly cost divided by the total dollar value (in \$1,000 units) of food stamp benefits redeemed at those stores reporting a cost. This procedure has the effect of producing a weighted average of standardized costs, where each store's cost is weighted by its relative food stamp volume.

Imputed Data

An employee's hourly wage is the only data item which was imputed when retailers did not give a direct response. The imputed wage for a given type of employee (e.g., cashier) was based on the average reported wage among all employees of that type within all stores in a store type. For example, missing wages for convenience store cashiers were imputed using the average reported cashier wage among all convenience stores.

Wage data were most commonly missing for owners of small/medium grocery stores.¹ These operators may not pay themselves a wage or salary, even though they perform food stamp-related activities for which a value must be determined. A sufficient number of grocer store owners reported a salary for the analysis to base the imputed wage level on a relatively solid estimator.

¹Wages were imputed in 5.6% of non-management employees and 31.9 percent of store owners or managers.

Exhibit VB-2

Value of Food Stamp Benefits Redeemed

	Major Store Type				
	Super- markets	Grocery Stores	Convenience Stores	Other Stores	TOTAL:
<u>Total Value of Benefits Redeemed Per Month</u>					
EBT	\$317,880	\$79,587	\$25,678	\$9,017	\$432,162
Coupons	112,767	7,889	6,124	2,113	128,893
<u>Average Value of Benefits Redeemed Per Store</u>					
EBT	\$13,821	\$1,447	\$1,223	\$601	\$3,791
Coupon	4,903	143	292	141	1,131
Number of Stores	23	55	21	15	114

Sources: FNS Monthly Redemption Reports, October 1987-March 1988. EBT Benefit Usage Reports, January 1988-June 1988.

Finally, the value of store space was imputed with data collected from commercial realtors in Reading. Originally, the current analysis intended to estimate space costs on retailers' perceived value for the space EBT equipment occupies. That effort proved unreasonable, however, because retailer valuation of space costs displayed enormous variation and dependence on a few large values. Therefore, the per square foot value of store space was imputed in all cases with the estimated current retail value of supermarkets, grocery stores and convenience stores. These values are \$1.33 per square foot per month for convenience stores, \$1.13 per square foot per month for supermarkets, and \$0.53 per square foot for grocery stores and "other" store types. The effect on overall space costs of using retailers' valuation of store space is presented in Appendix VC.

Tests for Statistical Significance

A number of assumptions underlie the tests for statistical significance on EBT-coupon differences presented for the non-checkout cost measures in Chapter 5. As explained previously, cost per \$1,000 of benefits redeemed, the main measure used for retailer costs, is a weighted average of store costs. The weight used for a given store is that store's food stamp redemption level, relative to total food stamp redemption. Because this measure is an average, we may treat cost per \$1,000 of benefits redeemed (under either the EBT system or the coupon system) as normally distributed with a suitable mean and standard deviation. It is customary to refer to the estimate of this standard deviation as the standard error of the mean. These standard errors are presented in the main cost exhibits of Chapter 5.

For cost per \$1,000 under a single system, the standard error mainly measures variation among stores -- that is, response variation arising from differences in store operations. For example, reconciliation costs may differ between two similar stores because one store chooses to put more effort into these activities than the other store. Variation within an individual store may also contribute, however, to the overall variation measured by the standard error. Store responses may vary because activity levels fluctuate over time, and respondents may recall an extreme when the average is more appropriate. Responses can also vary with the way a respondent arrives at the response. For example, store managers may estimate the number of monthly

hires by the number hired last month, even though that number might not accurately reflect the level in a typical month.

A number of efforts have helped to reduce the level of within-store variation. These steps included wording questions to improve recall accuracy and extensive interviewer training to ensure that questions were asked consistently and accurately.

Although aggregate measures of retailer EBT costs or coupon costs reflect both among-store and within-store variation, among-store variation can be cancelled out by taking the simple store differences between EBT and coupon costs (per \$1,000 of redemptions). That is, we subtract EBT costs from coupon costs at the store level and average this difference over all stores. Because both estimates are provided by the same respondent, calculating the difference at the store level should also remove systematic types of imprecision that the respondent contributes to the estimates.

Statistical tests on EBT-coupon cost difference in Chapter 5 follow this approach. First, the difference between EBT and coupon costs is calculated at the store level. The mean of these differences is then tested for significant difference from zero.

The advantage of removing within-store variation which is gained by this approach is offset slightly by restrictions which are placed on the data from each store. Calculating an EBT-coupon cost difference at the store level requires complete reported information about both systems. If a store gave incomplete information for one system, a store difference could not be computed and the provided information would be omitted from the significance test. As a result, significance tests are based on a slightly smaller sample than was used to estimate costs per \$1,000 of redemptions and their standard errors.

Checkout Counter Costs

The analysis of system impacts on checkout counter costs in Chapter 5 largely replicates the analysis conducted during the original demonstration. The analysis proceeded through the following five steps:

- 1) use regression models to estimate the incremental payment and total transaction time required for EBT and food stamp coupon transactions, compared to cash transactions;

- 2) use regression models to estimate the impact of EBT system problems and other non-routine events on payment and total transaction times;
- 3) using the characteristics of a "typical" EBT purchase and the estimated coefficients from the first step, calculate the average transaction time for the purchase using first cash, then food stamp coupons and the EBT system as payment methods.
- 4) convert the times from Step 3 into estimated cashier costs per transaction; and
- 5) adjust the cost estimates to reflect the time cashiers sometimes spend waiting for the next customer to arrive.

The following sections present further detail on the procedures used in developing these estimates.

Basic Regression Estimates

The analysis of checkout cost is ultimately interested in the influence of payment method on the time it takes to complete a transaction. If transaction time differed only by the payment method, this task could be easily completed by comparing large numbers of observations that differ only in the form of payment. Transaction times are influenced by many other factors, however, most of which bear little relation to payment form. For example, transaction time is likely shortened if someone other than the cashier bags the groceries. Similarly, events such as produce weighing or price checks contribute to the length of a transaction. Because of the large number of factors which determine transaction time, regression analysis is most suited to disentangle the contributions of the major elements. In this context, the variation of a dependent variable (e.g., total transaction time) is seen as the sum of contributions from explanatory variables (such as the number of items purchased, the payment method, or the presence of price checks), each multiplied by a coefficient.

In Chapter 5, we analyzed two dependent or outcome variables:

- the total time of the transaction, from the start of the order through ringing, payment, and bagging to the end of the order.

- the payment time of the transaction. For EBT purchases, this starts with the card swipe and ends when the receipt is printed; for purchases with cash or food stamp coupons, it is the time the cashier determines the total purchase amount until the customer receives the purchase receipt.

The analysis of total time yields an estimate of the incremental effect of the payment form on the overall checkout process. The analysis of payment time, however, is less exact. Unlike cash or food stamp coupon purchases, EBT payment is not always a continuous process. A cashier may swipe an EBT card prior to ringing up the order (which would begin payment time) and not complete the payment until finishing the ringing. Nevertheless, to give a more complete perspective on the effects of an EBT system at the checkout counter, both payment time and total transaction times are analyzed.

Exhibit VB-3 (which repeats Exhibit 5-5 in Chapter 5) lists the set of explanatory variables used in the regression analyses, organized into several broad categories. The forms of payment are the main explanatory variables in the analysis. These variables indicate the presence or absence of each of the following: cash, personal checks, food stamp coupons, EBT payment, other coupons, and some other form of payment (such as vouchers for the Women, Infants, and Children Program). In order to view all the other forms of payment as time increments relative to cash, the model specifies cash as the constant term. With the exception of variables involving the number of items, all other explanatory variables also indicate the presence or absence of the variable in the transaction.

The effects of food stamp coupons and the EBT card proved too complicated to summarize by using single indicator variables for these two payment forms. Instead, each is represented by three indicators (for a total of six variables):

- EBT card (or food stamp coupons) only;
- Combined EBT card (or food stamp coupons) and cash purchases;
- All other EBT card (or food stamp coupons) combinations.

Exhibit VB-3

Explanatory Variables in the Regression Analyses

Forms of Payment (and Combinations of These)

Constant (represents payment in cash)
EBT card only
EBT card and cash (but no other forms of payment)
All other combinations of payment forms that include the EBT card
Food stamp coupons only
Food stamp coupons and cash (but no other forms of payment)
All other combinations of payment forms that include food stamp coupons
Check
Other coupons only
Other form of payment

Variables Involving the Number of Items

Number of items
Number of items, when only cashier does bagging
Number of items, when no bagging takes place

Events During Ringing

Price checks (indicator variable)
Produce weighing (indicator variable)

Other Variables (all indicators)

Presence of a problem with EBT system
Other non-routine circumstances or events
"Long" transaction
"Penny candy" transaction

Variables involving the number of items are included in the model because of their strong influence on transaction times (although less strong an influence on payment time). The number of items is treated both as an individual (covariate) variable and in combination with whether the cashier or no one bags groceries (when the cashier bags, each item adds an additional amount to total transaction time). This specification is satisfactory because the corresponding interaction terms (between number of items alone and in combination with the two bagging outcomes) provide incremental slopes against the overall slope represented by the number of items coefficient.

Events during ringing are represented by variables indicating price checks or produce weighing.

Observers recorded the occurrence of any of 13 EBT-related problems. These events were collapsed into a single indicator variable for purposes of the general regression model. Other regression analyses were used to measure the impact (if any) of each of the problems on total transaction time.

Finally, three indicator variables identify special events which tend to affect the transaction times. One is the presence of other (non-EBT related) problems or circumstances. The second reflects the observer's judgment that the transaction was unusually long for some reason not related to the EBT system and not recordable on the observation form. The third, "penny candy", identifies purchases whose average price per item was less than ten cents.

The regressions for payment time did not include the explanatory variables for bagging, price checks, or produce weighing, because those variables pertain to other phases of the transaction.

The regression models were separately applied to supermarket, grocery store and convenience store transactions so that any differential impacts of the EBT and coupon systems across store types could be isolated and included in separate cost estimates for each store type. As explained in Chapter 5, "other stores" were not included in the analysis because checkout procedures in these stores tend to be highly variable.

The analysis of checkout observations during the original EBT demonstration focused on "routine" EBT transactions. A non-routine EBT

transaction was defined as one for which any of the final four variables in Exhibit VB-3 had a positive value. The current analysis makes no distinction between routine and non-routine transactions. The EBT system had been operating for nearly four years at the time the observation data were collected, and any remaining system-related problems (e.g., reswiping a damaged client card) or non-system related problems (e.g., "extra long") should be considered part of normal checkout counter operations.

The results of the regression analysis for the three major store types are presented as Exhibits 5-6 and 5-7 in Chapter 5.

Even though some explanatory variables may not be intrinsically interesting, it is important to keep the full set of explanatory variables in mind when interpreting any single coefficient. For example, the coefficient of "EBT only" tells how much the total time of such a transaction differs (on average) from that of other types of transactions, after allowing for simultaneous change in the other explanatory variables in the model. If one or more of these other variables were not included in the model, the interpretation of the coefficient for "EBT only" would be different. This issue will become more apparent in the next section, where we discuss the effect of excluding some combined EBT-cash transactions from convenience store observation data.

Estimating Average Total Transaction Times for the Typical EBT Transaction, Using Different Payment Methods

The previous section described the regression analyses which provided estimates of the incremental time of a payment method relative to a cash purchase. These incremental times, however, are not sufficient for estimating the impact of the EBT system on average total transaction times. For instance, they do not incorporate the effects of EBT system problems on transaction times.

To estimate system effects on average transaction times, we define a "typical" EBT purchase transaction. This transaction simply reflects the characteristics of all observed EBT transactions. Exhibit VB-4 shows the characteristics of a "typical" EBT transaction, by store type and for all stores. Values in the exhibit reflect the mean value of that variable across

Exhibit VB-4

Profile of the Typical EBT Transaction, by Store Type^a

	Super- markets	Grocery Stores	Convenience Stores ^b	All Stores ^b
EBT card only*	0.43	0.92	1.0	0.56
EBT card and cash*	0.39	0.08	0	0.30
EBT card, other combinations*	0.19	0	0	0.14
Check*	0	0	0	0
Other Coupons*	0	0	0	0
Other form of payment*	0	0	0	0
Items	48.73	6.25	4.43	38.16
Items, only cashier bagging	15.71	5.32	3.79	13.06
Items, no bagging	10.23	0.13	0.63	7.77
EBT problem*	0.09	0.55	0.09	0.08
Candy purchase*	0	0	0	0
Price check*	0.08	0.01	0.02	0.07
Produce weighing*	0.24	0.09	0.07	0.20
Other unusual circumstances*	0.06	0.02	0.02	0.05
Extra long transaction*	0.07	0.03	0.02	0.06

Notes: ^aEach entry gives the mean value for that variable over all EBT transactions in the particular store type. For indicator variables, which are denoted by an asterisk, the result is simply a proportion.

^bExcludes 16 EBT card and cash transactions because no comparable food stamp coupon and cash transactions were observed.

Source: Phase C observation data.

all EBT transactions. For example, supermarket EBT purchases averaged 48.73 items and required produce weighing in 24 percent of the transactions. Payment form entries describe the relative frequency with which each payment form appears. Thus, 92 percent of grocery store EBT purchases used only the EBT card; the remaining 8 percent combined an EBT payment with cash.

In estimating the average transaction time for an EBT transaction, we multiply the characteristics of the typical EBT transaction by the estimated coefficients from the corresponding regression model. This provides the average total time for the typical EBT transaction, which is shown in Chapter 5, Exhibit 5-10. To estimate the average total time for an identical transaction using food stamp coupons, we make two changes in the above procedure. First, we apply to "FS coupons only," "FS coupons and cash," and "FS coupons in other combinations" the proportions that the sample yields for the equivalent EBT payment variables. We also set to zero the proportion of transactions experiencing EBT problems, because such problems cannot occur when a recipient uses coupons. This process predicts the average time it would take to process a typical EBT transaction if food stamp coupons were used instead of the EBT card as the payment form.

The same general procedure is used to estimate the average total time for the same typical EBT purchase if cash were used. To approximate a cash purchase, we eliminate the three EBT card terms and set the proportion of transactions with EBT problems equal to zero.

This general procedure created problems when we attempted to estimate transaction times for food stamp coupon purchases at convenience stores. Roughly 15 percent of all EBT purchases at convenience stores are combined with cash. Unfortunately, we did not observe any combined food stamp coupon and cash transactions at convenience stores. The regression model for convenience stores, therefore, could not provide an estimated coefficient for the "Food Stamp coupons and cash" variable. Without that coefficient, we are unable to estimate an average transaction time if food stamp coupons (with cash) had been used instead of the EBT system (with cash). Therefore, we performed the general procedure for estimating average transaction times as if no EBT card and cash transactions had been observed at convenience stores. This required refitting the regression model to the reduced sample and

repeating the process. The figures in Exhibit VB-4 and in Exhibit 5-11 of Chapter 5 are based on the reduced EBT sample.

Estimating Costs per \$1,000 of Benefits Redeemed and Costs per Store Month

The next step in the analysis is to translate the average total transaction times into estimates of retailer participation cost. Two measures are of interest: the monthly cost for the average store and the average cost per \$1,000 of benefits redeemed.

The first step in estimating the two measures of store cost is to estimate the cost of the added time required to complete a food stamp transaction. This cost is the product of two numbers: (1) the difference in the time required for a typical EBT or coupon transaction and an equivalent cash transaction, and (2) the cost to the store of that time, which is measured by cashier wages. The average cashier wage among demonstration stores was \$3.96 for supermarkets, \$4.08 for grocery stores and \$4.09 for convenience stores.

The EBT and food stamp coupon costs per transaction for each store type are presented in Exhibit VB-5.

Translating cost per transaction into cost per \$1,000 of benefits redeemed requires information about the number of sales a store needs to redeem \$1,000 in food stamp benefits. This information is presented for EBT sales in Exhibit VB-6. Because no comparable numbers are available for the coupon system, we assume that the number of coupon transactions per \$1,000 of coupons spent is the same as for the EBT system. Exhibit VB-7 shows the results of this step of the analysis.

Adjusting Costs to Reflect Limited Opportunity Costs

The procedures described above implicitly assume that cashiers have an alternative use (or opportunity cost) for the added time they spend with EBT and coupon purchases. In some situations this assumption may be incorrect, such as when a store is not particularly busy. To estimate the (reduced) costs to retailers when this occurs, we assume that any EBT or coupon transaction which is followed by another transaction within 20 seconds

Exhibit VB-5

Cost per Transaction by Store Type

	Super- markets	Grocery Stores	Convenience Stores
<u>EBT</u>			
Time of typical EBT transaction minus time of equivalent cash transaction	48.49	46.03	50.76
Wage	\$3.96	\$4.08	\$4.09
Cost per transaction ^a	\$0.053	\$0.052	\$0.058
<u>Coupon</u>			
Time of typical EBT transaction minus time of equivalent cash transaction	46.53	48.30	28.75
Wage	\$3.96	\$4.08	\$4.09
Cost per transaction ^a	\$0.051	\$0.055	\$0.033

Note: ^aCost per transaction = (1/3600) (difference in typical transaction times) x (wage). Transaction time is calculated in seconds.

Source: Phase C Observation Data.

Exhibit VB-6

Transactions per \$1,000 of EBT Benefits Spent

	Super- markets	Grocery Stores	Convenience Stores
Transactions per \$1,000 of EBT Benefits Spent	28 708	22 512	10 602

Exhibit VB-7

**Retailer Checkout Costs:
Full Cost per \$1,000 of Benefits Redeemed**

	Super- markets	Grocery Stores	Convenience Stores	All Stores
<u>EBT</u>				
Transactions per \$1,000 benefits spent	33.9	127.1	202.5	61.1
Cost per transaction	\$0.053	\$0.052	\$0.058	\$0.053
Cost per \$1,000 benefits spent ^a	\$1.80	\$6.61	\$11.74	\$3.39
<u>Coupon</u>				
Transactions per \$1,000 benefits spent ^b	33.9	127.1	202.5	61.1
Cost per transaction	\$0.051	\$0.055	\$0.033	\$0.05
Cost per \$1,000 benefits spent	\$1.73	\$6.99	\$6.68	\$3.01
<u>EBT-Coupon Difference</u>	\$0.07	-\$0.38	\$5.06**	\$0.38

Statistical significance: +, $P < 0.10$; *, $P < 0.05$; **, $P < 0.01$.

Notes: ^aCost per transaction from Exhibit V-B5. Cost per \$1,000 was computed before rounding. Hence, the cost per \$1,000 is not exactly the product of the figures shown here for transactions per \$1,000 and cost per transaction.

^bTransactions per \$1,000 EBT benefits spent are used for both card and coupon calculations, because no comparable numbers are available for coupon transactions.

Source: Phase C Observation Data.

represents a situation in which the cashier is experiencing little or no "idle" time. That is, if the cashier had not spent extra time on the food stamp purchase, he or she would have been processing the next customer's purchase.¹

Calculating the cost per \$1,000 of redemptions incorporating the 20-second cutoff is similar to the procedure described previously. The only difference is in the cost per transaction. For these purposes, we want to count only the cost of those food stamp transactions that are followed by another transaction within 20 seconds; other transactions are assumed to have zero opportunity cost (relative to cash transactions). This factor reduces the cost per transaction by the relative frequency of transactions with opportunity cost. The resulting cost per transaction appears in Exhibit VB-8. These are translated into costs per \$1,000 of benefits redeemed in Exhibit VB-9.

¹Although a 20-second interval between purchases is arbitrarily chosen, any measure of the time between transactions might not reflect the level of business in the store. For example, a store manager might respond to long lines at the checkout counter by opening another checkout lane. In this situation, the procedure used here could underestimate the opportunity cost (20-second intervals could appear even though the store was in fact quite busy).

Exhibit VB-8

Cost per Transaction Incorporating 20-Second
Opportunity Cost Cutoff

	Super- markets	Grocery Stores	Convenience Stores
<u>EBT</u>			
Time of typical EBT transaction minus time of typical cash transaction	48.49	46.03	50.76
Cashier wage	\$3.96	\$4.08	\$4.09
% of transactions with opp. cost	0.62	0.60	0.44
Cost per transaction ^a	\$0.033	\$0.031	\$0.025
<u>Coupon</u>			
Time of typical EBT transaction minus time of typical cash transaction	46.53	48.30	28.75
Cashier wage	\$3.96	\$4.08	\$4.09
% of transactions with opp. cost	0.72	0.76	0.26
Cost per transaction ^a	\$0.037	\$0.042	\$0.008

Note: ^aCost per transaction = (1/3600) (difference in typical transaction times) in seconds) x (wage) x (percent of transactions with opportunity cost).

Source: Phase C Observation Data.

Exhibit VB-9

Retailer Checkout Costs:
Limited Opportunity Cost per \$1,000 of Benefits Redeemed

	Super- markets	Grocery Stores	Convenience Stores	All Stores
<u>EBT</u>				
Transactions per \$1,000 benefits spent	33.9	127.1	202.5	61.1
Cost per transaction	\$0.033	\$0.031	\$0.025	\$0.031
Cost per \$1,000 benefits spent	\$1.12	\$3.94	\$5.06	\$1.98
<u>Coupon</u>				
Transactions per \$1,000 benefits spent ^a	33.9	127.1	202.5	61.1
Cost per transaction	\$0.037	\$0.042	\$0.008	\$0.034
Cost per \$1,000 benefits spent	\$1.25	\$5.34	\$1.62	\$2.05
<u>EBT-Coupon Difference</u>	-\$0.13	-\$1.40	\$3.44**	-\$0.07

Statistical significance: +, $P < 0.10$; *, $P < 0.05$; **, $P < 0.01$.

Note: ^aTransactions per \$1,000 EBT benefits spent are used for both card and coupon calculations, because no comparable numbers are available for coupon transactions.

Source: Phase C Observation Data.

Appendix VC

SUPPLEMENTARY ANALYSES OF EBT SYSTEM EFFECTS ON RETAILERS

This appendix presents two analyses which supplement the analysis of the effects of the EBT system on participating retailers discussed in Chapter 5 and Appendices VA and VB. The first analysis outlines the results of six waves of interviews with a small sample of retailers over the course of the extended demonstration. The second analysis largely replicates the analysis of EBT system space costs from Chapter 5, modifying it somewhat by using retailer perceptions of value of space occupied by EBT equipment rather than estimates of the space's rental value.

Periodic Survey Results

As discussed in Appendix VA, approximately 30 demonstration retailers were interviewed on six occasions between October 1986 and February 1989. Ten supermarkets, ten grocery stores, and ten convenience stores were represented in the longitudinal sample, although attrition required the replacement of three grocery stores and one convenience store. Because the purpose of these interviews was to monitor system operations, the sample was selected on the basis of high food stamp redemptions in each store-type, and their responses are not necessarily representative of all participating retailers. Three waves of interviews were conducted during Phase B, and the remaining three waves were conducted after implementation of the redesigned EBT system.

Exhibit VC-1 summarizes retailer responses to key questions over the six interview waves.¹ As shown in the exhibit, these retailers preferred the EBT system to the coupon system by a margin of over six to one throughout the lifetime of the extended demonstration. Although EBT system preference dropped slightly (to 86.2 percent) in the last interview wave during Phase B,

¹Although the interviews addressed a wider range of system-related issues, the topics in Exhibit VC-1 highlight areas particularly relevant to Phase C design changes.

Exhibit VC-1

Periodic Retailer Interview Responses

	Phase B			Phase C		
	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6
Date	Oct. 1986	Dec. 1986	March 1987	Aug.- Sept. 1987	June- Oct. 1988	Jan.- Feb. '1989
System Preference						
EBT	80.0%	90.0%	86.2%	89.7%	96.7%	93.1%
Food Stamp Coupon	13.3%	6.7%	13.8%	10.3%	3.3%	3.4%
No Preference	6.7%	3.3%	0.0%	0.0%	0.0%	3.4%
Transaction Speed						
Faster	6.7%	6.7%	27.6%	42.9%	20.7%	20.7%
Slower	33.3%	16.7%	6.9%	3.6%	6.9%	3.4%
No change	60.0%	76.7%	65.5%	53.6%	72.4%	75.9%
System Downtime						
Yes	86.7%	50.0%	51.7%	27.6%	30.0%	34.5%
No	13.3%	50.0%	48.3%	72.4%	70.0%	65.5%
Reconciliation Problems						
Yes	30.0%	36.7%	55.6%	20.0%	10.0%	35.7%
No	63.3%	56.7%	33.3%	43.3%	53.3%	64.3%
Don't know	3.3%	6.7%	11.1%	33.3%	36.7%	0.0%
Number of Respondents	30	30	29	29	30	29

Source: Periodic retailer interview data.

it rose (to 89.7 percent) following Phase C system implementation. EBT system preference remained above ninety percent during the final two interview waves.

Retailers were also asked whether, during the time since the previous interview, they perceived any changes in the amount of time it takes the system to process a transaction. As shown in Exhibit VC-1, over 40 percent of the sample reported a decrease in the time required to complete a transaction during the first interview following Phase C implementation -- a result consistent with expected improvements in system performance. In addition, only a very small percentage of retailers reported slower transaction speeds after implementation of the redesigned system. Retailers were asked whether, in the time period since the previous interview, they had noticed any periods when the system was not accessible and they were unable to process a transaction. Response frequencies in Exhibit VC-1 indicate that retailers generally perceived fewer periods of system downtime during Phase C than they noticed during Phase B. This result is also consistent with Phase C design efforts to improve system accessibility, although, as was shown in Exhibit 5-2 (Chapter 5), incidents of lengthy system downtime were experienced during both time periods.

Finally, retailers were asked if they had difficulties reconciling EBT sales with credits to their store's bank account. Prior to Wave 6, retailer responses followed a pattern consistent with the improved access to deposit information offered by the redesigned system -- that is, fewer retailers indicated having troubles reconciling EBT sales during the first two post-implementation waves than during the Phase B interviews. Although the percentage of retailers reporting reconciliation problems increased somewhat during Wave 6, the percentage of retailers reporting no reconciliation problems also increased.

In summary, the monitoring interviews indicate that retailers did perceive improvements in system performance following implementation of the redesigned EBT system. In addition, following system implementation, retailers more consistently preferred the EBT system to the coupon system, possibly as a result of improved performance.

Alternative Space Cost Analysis

The analysis of the cost of front-end space occupied by EBT equipment presented in Chapter 5 was based on unit space cost estimates from the rental value of Reading commercial property. An alternative perspective on estimated EBT space costs is provided by examining the value retailers perceive the space to be worth. This section discusses the effects on space costs of applying perceived values to unit space cost rather than the rental value.

Retailers' perceptions of front-end space value greatly exceeds the estimated rental value of the space. In Chapter 5, the average rental values for all stores was \$0.99 per square foot of store space. As shown in Exhibit VC-2, this value increases to \$31.79 per square foot when based on retailer perceptions.

Perceived space value also varies substantially by store-type. Convenience store respondents value front-end space the highest, at \$70.43 per square foot. Managers representing "other" stores value their space lowest, averaging \$7.19 per square foot. Given the magnitude of these estimates, basing monthly space costs on retailer perceived value has an enormous impact on the overall results. For all stores, total space cost reaches \$32 per \$1,000 of benefits redeemed. Even the more conservative adjusted space cost (which reflect alternative uses) is sizable, averaging about \$25 per \$1,000 of redemptions. In comparison, the full cost estimate of space in Chapter 5 was \$1.22 per \$1,000 of benefits redeemed.

The primary benefit of using retailer perceptions of space value is that these estimates reflect the greater value of front-end space, relative to the rest of the store. Retailers can use front-end space to house displays of impulsively purchased high-markup items. Customer attitudes are also influenced last at the front-end. By assuming a constant cost across all store space, rental cost likely understates the true value by not capturing this opportunity cost of front-end space. Retailer perceptions of space value are subject to limitations, however, which prompted the decision to use rental cost. Primarily because retailer estimates of space value are arbitrary, they

Exhibit VC-2

Space Costs for the EBT System

	MAJOR STORE TYPE				All Stores
	Super-markets	Grocery Stores	Convenience Stores	Other Stores	
Average cost per square foot	\$33.48	\$21.60	\$70.43	\$7.19	\$31.79
Average square feet per store	13.43	1.69	2.33	3.23	4.48
Average monthly store cost	\$334.20	\$34.33	\$182.95	\$25.23	\$125.15
Adjusted cost per store per month	\$217.56	\$29.84	\$182.81	\$18.58	\$97.58
Full cost per \$1,000 benefits redeemed	\$24.18	\$23.19	\$149.62	\$38.06	\$32.01
Adjusted cost per \$1,000 benefits redeemed ^a	\$15.74	\$20.16	\$149.51	\$28.02	\$24.79

Number of stores	23	52	21	13	109
Average Redemption	\$13,821	\$1,480	\$1,223	\$663	\$3,937
Standard Error ^b					
Full cost	\$4.30	\$3.30	\$59.58	\$10.67	\$5.60
Adjusted cost	\$4.51	\$3.50	\$59.59	\$9.07	\$5.27

Notes: ^aAdjusted costs reflect retailer alternative use for the space. If no alternative is suggested, a zero cost is assumed for the space.

^bMeasures the variation of store cost per \$1,000 of redemptions relative to the sample mean, weighted by redemption volume. See Appendix VB for a discussion of the standard errors and statistical significance.

Source: Phase C interview data.

are subject to wide variation. Retailer estimates of monthly front-end space value ranged from \$0.00 to \$500.00 per square foot. With no way to judge the reasonableness of these responses, rental cost is used in the analysis in Chapter 5.